COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper- Second-class postage paid at Boston, Mass.

Vol. III No. 25 | June 25, 1969 | Price: $9/year

Software Testing Not Yet Possible, Licklider States

WASHINGTON, D.C. – The quality of present day software is incapable of reliably supporting large, complex systems such as an antiballistic missile (ABM). Furthermore, such systems will be beyond the state-of-the-art for at least a decade, according to MIT Professor J.C.R. Licklider, an established computer expert.

Licklider's views appear in a recent report on the ABM prepared at the request of Sen. Edward M. Kennedy (D.–Mass.).

There does not yet exist, even theoretically, a way to determine if a software system does the job required, the report says. Large systems invariably have bugs, the report declares, and long periods of trial and error testing are required. But an ABM system, by its very nature, can never be tested adequately; yet it requires unusually high reliability.

Software is one of the major reasons that the report concludes that the proposed Safeguard missile system would not perform as required, and "should not be deployed at this time."

Licklider, one of the developers of time-sharing and author of the computer section of the report, told CW: "If such a system [as the ABM] is tried in the next decade, it will not work."

The report was prepared by Dr. Jerome Wiesner, MIT provost and presidential science advisor (1961-64), and Harvard Law School Professor Abram Chayes. It has been published under the title *ABM – An Evaluation of the Decision to Deploy an Antiballistic Missile System* and includes articles on the political effect of such a system, as well as on the practicality.

Computers Most Complex Ever

An ABM system is made up of three parts – radar, computers, and missiles. According to the

(Continued on Page 27)

DPMA Show Draws Record Crowd

CalComp Announces 2311-Compatible Disk Drive

MONTREAL – The DPMA show opened with records being broken in all directions. Before the ribbon was cut to open the exhibit area, and while most of the crowds were still on their way, the conference registration had broken previous records. So had the number of wives and the number of exhibitors present.

CalComp pulled a major surprise by announcing a number of new products not in the plotter area in which it has specialized for many years. Instead, the products are clearly aimed at the mass market.

30-Millisec. Disk Drive

These items include an IBM-compatible, 30-millisecond-access-time disk drive for $18,500 ("cheaper and twice as fast as the IBM 2311") and a buffered keypunch ("can increase productivity by 50%").

Perhaps the most significant event was also in the disk area. Caelus came out with a new marketing technique for its disk packs – grading them by the number of their identifiable weak spots.

These weak spots, Caelus said, are not detected on normal disk drives, but can be found by more careful examination with special equipment. On a user's disk drive, they would still pass as being "error free," at least when first used, but later dropouts could be expected at the point where the latent problems exist.

3 Grades of Packs

The new pricing structure puts a premium on packs having neither latent errors nor other errors. Caelus will sell these premium packs at $490, as opposed to $435 for packs with up to five weaknesses, or $350 with up to 10 weaknesses.

The idea of improving the quality of disk packs apparently will be a popular one in the future. Considerable attention was being paid to a disk-pack tester. This was shown by Peripherals, Inc. and came in two models. One of them tested the 6-disk packs, and one tested the large 2314 packs.

The tester, which costs $52,000 for the smaller version, uses a 7-minute, wired-in program which prints out the locations of each dropout.

Getting to Montreal was quite

(Continued on Page 3)

Eric Ustad, DPMA general conference chairman, and Charles L. Davis, DPMA international president, watch their wives cut the ribbon opening the DPMA show. (CW Wirephoto by Farmer)

Capitalizing of Some EDP Salaries Can Be Postponed Until IRS Ruling

WASHINGTON, D.C. – Software tax problems, created when the New York Region of the Internal Revenue Service decided that programmer and system analyst salaries must be partly capitalized, have ended – at least temporarily.

Differing from the regional ruling that "that nightmare, software" must be capitalized until a national ruling was given [CW, May 21], the IRS said firms may either capitalize or expense soft- ntil a decision is made.

ecision to hold the mat- ir eyance came after *Com- orld* reported on the position taken by the New York Region, and on the apparent differences between various IRS offices as to whether a study of the matter was in progress.

Under the New York ruling demanding compulsory capitalization, profitable companies would have found themselves paying additional taxes (and showing higher profits).

The amount involved, according to the IRS figures, was roughly equivalent to an additional tax burden of 25% of the hardware rental cost of the installation.

On the Inside

GE Testing a Network to Provide Nationwide Access to Central Files

BETHESDA, Md. – The final test of a computer network that provides for centralized files which can be accessed from local telephones throughout the U.S., and probably from Europe, is in progress. This news highlighted a description of General Electric's plans for expansion of its activities in the service field during the next few years.

Paul W. Sage of GE said that the network, to be started out of Cleveland, would allow firms to develop their own private information systems and to access the files simultaneously from around the country. Communication satellites would be used if the system were spread to Europe, he said.

The service, which will incorporate present GE time-sharing services, will be in operation late this fall in nearly 40 metropolitan centers, probably making it the largest service in the growing industry.

Altogether, a $34 million investment is currently committed for the network.

Details of other plans announced by GE for its various computer-service activities are given on page 27.

An End to Inflexible Leases?

Lease Signed Allowing Return of Unwanted Equipment

REDONDO BEACH, Calif. – A new type of third-party lease for computers, one which avoids the user's major snag of inflexibility, came to light here last week. Involved is a $10 million dollar leasing arrangement for IBM 360/30s, 40s, and up between TRW and Randolph Computer Co.

Under this arrangement TRW can return up to 40% of the equipment to Randolph during the lease period, just as it might return equipment which it was renting directly from IBM.

Any part of the equipment can be included, so if it turns out that some part of the equipment is overloaded, or, alternatively, is a "lemon" in actual operation, TRW will be able to reconfigure freely.

No similar type of "reconfigurable" lease has previously been publicly known, although possibly other large contracts have included this as a special clause.

The 42-month contract's main point allows TRW the right to return to Randolph any CPUs or peripheral units up to 10% ($1 million) of the total $10 million during the first year.

Over the remaining 30 months of the 42-month contract TRW has the right to return an additional 30% or $3 million in equipment for credit.

TRW's minimum total obligation will, however, remain at $10 million.

Lowell C. Carpenter, division material manager of TRW's Software and Information Systems division, paraphrased that old cliche when he told CW, "They laughed at me when I said I wanted to be able to return equipment that no longer was useful to us for full credit against the total contract price."

Carpenter's ideas were based on "the need for flexibility to change, update, relocate, or terminate EDP equipment that is used in a scientific and research-oriented operation."

Carpenter recalled that his proposals to leasing companies received several blunt refusals that even included hesitation from Randolph at first.

"DPF&G, for example, was in the running but felt it necessary to back down at the contract signing stage," said Carpenter.

Randolph did, however, modify TRW's original list of equipment by prohibiting any IBM Series 1800 and Model 20 equipment. The contract is composed mainly of 360/40s, 50s, and 65s.

Jack Arbor, executive vice-president at Randolph Computer, said that Randolph did charge a premium for the return option. TRW was charged the 36-month rate for the 42-month contract.

The contract was negotiated in August 1968 and was effective Oct. 1, 1968.

Arbor mentioned that Randolph's major consideration in writing the contract was that it called for multiple systems, and that so far TRW has not used the option.

Pentagon Orders 2 Dual GE-635s, 5 Satellite 115s

SCHENECTADY, N.Y. – Two dual GE-635s, with five satellite GE-115s, have been ordered by the Pentagon as a computational hub for the Air Force management information system.

The data services center also provides data automation support to the secretary of defense.

The two large-scale GE-635s will replace eight existing IBM systems at the center. The five small-scale GE-115s will provide the initial increment of remote terminals within the Pentagon and the Washington area, accessing the large GE-635s. The system cost is $12.2 million.

Installation of the equipment is scheduled in two increments starting in the late fall.

Wescon Includes 5 Tech Sessions On Computers

SAN FRANCISCO – Five technical sessions, out of 23, at Wescon's four-day meeting at the Cow Palace here August 19 to 22, will concentrate on the computer field.

All the sessions will be held in air-conditioned meeting rooms which will be constructed especially for the meetings.

Format is for three sessions to run concurrently each morning and afternoon.

At the same time, 1,180 displays by more than 600 manufacturers will be in progress.

Each of the technical papers represent a single subject of technology or management.

SEE PAGE 12

The keyboard recorder/verifier, foreground, puts the data on a tape cassette, which is later translated onto computer tape by the coverter, background.

3-Track Tape Produced by Input System Can Be Read by 7- and 9-Track Drives

PHOENIX – Keyboard input that can be read by nearly any computer is the claim for a new series of keypunch-replacement units.

Variable length records (in fixed length blocks) are keyed onto a tape cassette in ASCII code, according to the manufacturer, Computer Access Systems. This recording is serial, low order first, to allow communications use with hardware currently under research.

The cassette is then read into a converter, which writes onto standard, 1/2-in. magnetic tape, using only the three middle tracks. This, the company says, provides more than enough signal to allow reading by existing 7- or 9-track tape units.

The information is reformatted and unblocked by special software, and processed through a translation table into computer-usable information. The table is written in a very simple Cobol, according to the company, to allow compilation by virtually any Cobol compiler.

Two input units are offered. The Model 4000, a keyboard/verifier, sells for $3,425 and leases for $76.50 per month, the company said. The Model 2000, with no verification capability, sells for $1,925 and leases for $43.50 per month.

The Model 6000 converter sells for $9,850 and leases for $275 per month.

Deliveries are scheduled to start "very soon" a company spokesman said.

Computer Access Systems has offices at 3050 W. Clarendon here.

First 'Bug' Was Really a Moth

BOSTON – Do you know the origin of the term "debugging"?

Back in 1948 at Harvard University, the programmer and engineers were having trouble getting a program to run. The computer, it seems, was operated with relays, rather than our current core memories. After a lot of hunting around and a lot of head-scratching, the engineers found a moth trapped inside one of the relay cases. It had been beaten to death by the triggering of the relay.

According to Cmdr. Grace Hopper, one of the programmers present at the Univac

Mark II installation then, the moth was enshrined in the machine's log with Scotch tape, and it is still there today, as far as she knows.

The bug may have been removed from Mark II, but the word still gets a lot of exercise.

DPMA Conference Opens With Record Attendance

(Continued from Page 1)

a struggle for many people, with planes and airline buses all experiencing problems.

Some attendees coming from Minneapolis were delayed when a tractor crashed into the only BOAC airliner in the area. As a result, they arrived here at about 5 a.m.

Others from Rochester found their "confirmed" reservations were on nonexistent flights, and many from New York, Philadelphia, and Boston found that even "confirmed" reservations did not provide them with seats on the scheduled planes.

But the hotel situation – unlike that during the Spring Joint Computer Conference in Boston – seemed under control. Most people were spending their time working out how they could best take advantage of activities at the conference rather than wondering about where they could sleep.

Data Set 'Can Triple' C2 Transmission Rate

SILVER SPRING, Md. – A $10,000 data set, which allows private 2,400 bit/sec lines to handle signals up to three times that speed with only normal (C2) conditioning, has been introduced by Rixon Electronics, Inc. for delivery late this year.

The data set, called Sebit-72, is especially useful for improving throughput in remote batch applications or for increasing core-to-core transmission rates between central and remote computers. The company says it is not being considered for dial-up operations because only about 10% of the common carrier dial-up network would be able to use the equipment.

Computer Not Listed

Rixon expects the equipment to be able to work with most computers, but is not listing those they consider suitable until tests have been completed and the manufacturers have agreed that the unit is compatible. Other Rixon units are currently working with IBM and Univac computers with the manufacturers' approval.

Successful tests with military computers have been completed on the unit, and production has started on the civilian model. Tests on particular computers are currently scheduled and are being set up.

Techniques Involved

Immunity from ambiguity of the phase of the recovered carrier is achieved by using two-two-four level data coding. An error-detection indicator flashes a "data transmission" light when errors are detected.

The Sebit-72 is not pattern sensitive to input data because of the use of a special, internal code converter. Continuous automatic adaptive equalization is simply set to the installation and the day-to-day operation of the set. The Sebit-72 continuously measures the quality of the circuit, and equalization is continuously updated without operator intervention. This compensates for the distortions inherent in telephone transmission and for amplitude deviations sometimes encountered in telephone systems.

Picturephones Used as Data Terminals To Retrieve Information From Computer

PITTSBURGH, Pa. – The Bell system's Picturephone is being put to use at the Westinghouse Electric Corp. as a desk-top information center.

Under the experimental system, a Westinghouse executive can dial a telephone number and obtain the desired information in graphic form on the Picturephone screen.

The information is retrieved from a computer at the Westinghouse Tele-Computer Center in Braddock Hills in suburban Pittsburgh.

The program is part of a six-month Westinghouse trial of Picturephone service in cooperation with Bell. Forty Picturephone sets are installed for the trial period in Westinghouse offices and conference rooms in Pittsburgh and New York.

"We thought this would be a good way of demonstrating what Picturephone can do besides providing video phone conversations," said R.C. Cheek, director of management systems for Westinghouse.

"We decided to select a variety of data-retrieval applications that would demonstrate the instrument's versatility."

Using the Picturephone, a user can dial a number to obtain domestic, Washington, and international news items or information of foreign currency exchange rates.

Or he can get late stock-market reports, or daily reports on a special Westinghouse testing program being carried on near Baltimore. The computer also stores Westinghouse Broadcasting audience rating information and reports on the company's international operations.

Obtaining the information is as simple as making a phone call.

R.C. Cheek, Westinghouse director of management systems, uses his Picturephone to call up information from the company's computer.

The user dials the computer's phone number and then dials his own extension number to identify himself as caller. The computer then displays on the 5-1/2-by-5-in. Picturephone screen an index of the kinds of information available.

The user then dials the number indicated for the data he wants.

Westinghouse management systems personnel adapted the Picturephone to the computer display application, using additional equipment furnished by Bell. Programming was done by the Westinghouse Information Systems Laboratory and the Tele-Computer Center.

The information is fed to the computer from several sources. The company's public relations department and a wire service provide news items. Foreign currency data is supplied by a bank and stock information, updated hourly during trading on the New York Stock Exchange, by a brokerage.

The computer can even be selective in what information it gives to which caller. When a line executive calls, for instance, the index lists a number he may dial to obtain particular operating data concerning his own organization.

Other callers, however, are not shown the index number. Should they dial the number, the computer politely informs them they have made an "input error."

"This just demonstrates one of the capabilities of the system, that of providing selective information to selected users," Cheek said.

Small Time-Sharing System Provides Big System Features

MAYNARD, Mass. – A new, special-purpose or single-language, small computer time-sharing system using the conversational language, Focal, has been introduced by Digital Equipment Corp.

The system is designed specifically for educational and engineering applications, Digital said. But because it lowers the time-sharing terminal cost to $5,400 with Teletype, the lowest price yet offered, and a price lower than the yearly rental rate of large, time-sharing computer terminals, it is expected to have a variety of other applications.

The maximum number of terminals in the system is seven. With the addition of more core memory and other hardware options, the number of terminals can be increased to 16 or more and the system made general-purpose, giving it the capability of using a variety of computer languages, Digital said.

The key to the system, which can be installed on any DEC PDP-8, PDP-I, or PDP-8/L equipped with disk storage, is Focal. Disk capacity can vary from 32,768 words to more than a million words, depending on user requirements. In all cases, Focal permits the storage of programs in a common library on the disk, Digital said.

The system is designed so that if a user designs a program requiring more than his allotted space in core memory, that program can be broken into segments, and the needed segments stored in the disk storage unit. When it is time to call up this program, Focal first removes the segment in the core memory and takes the remaining segments from the disk storage unit, automatically chaining the program together in its proper sequence. There is common storage of up to five variables between segments, Digital said.

Focal originally was designed for use by one operator at any of DEC's PDP-8 family of small computers. Since then, two- and four-user versions have been made available for use with the PDP-8 line, as have single-, two-, and four-user versions for use on DEC's medium-scale, 18-bit computers. Focal (Formula Calculator) is similar to Joss.

Focal's 12 functions include trigonometric, logarithmic, device controls and sign part, integer part, absolute value, square root, and random number. Individual character editing eliminates the need to correct an entire line due to one typographical error. A trace feature allows an operator to determine not only what the error is, but also its location in the program, Digital said.

Other program specifications include five arithmetic operations – exponentiation, multiply, divide, add, and subtract – and an exponential range of 10 to the plus or minus 600th power. All variables may be subscripted. Two arithmetic subroutines are available so users can choose the correct six- or ten-digit precision.

Multiuser versions of the language have proved appealing, according to Norman Doelling, marketing manager for the product, allowing two, three, and four users to work on different problems, as if each had his own computer. Now, a similar advantage can be enjoyed by up to seven users, each of whom has access to disk storage for his programs, he said.

Order Entry System

Blue Chip Stamps, a Los Angeles-based trading stamp company, is using Marketing Systems, Inc. data recorder-transmitters to handle orders in its 84 redemption centers. Orders to the warehouse are recorded on a magnetic tape cartridge via a 10-key adding machine that also produces hard copy. The tape is then rewound and the data transmitted when an operator at the computer center calls the store with a card-dialer telephone. An MSI-214 nine-track, 800 bit/in. receiver at the center records the data on magnetic tape for processing by the center's IBM 360 computer.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

TM Reg. U.S. Pat. Off.

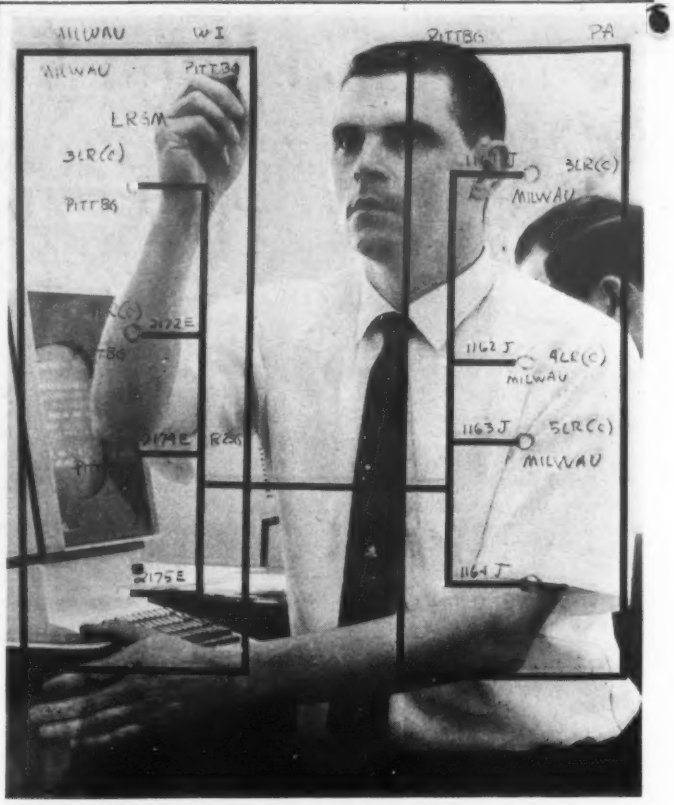
Weekly Newspaper – Second Class Postage Paid at Boston, Mass. Published every Wednesday by COMPUTERWORLD, Inc., 60 Austin St., Newton, Mass. 02160. Telephone: (617) 332-5606 & TWX: 710-335-6635. Copyright 1969 by COMPUTERWORLD, Inc.

Alan Taylor, *Editor*. Robert M. Patterson, *News Editor*. Neal Wilder, *National Sales Manager*. Margaret Phelan, *Circulation Manager*. Henry Fling, *Art Services Supervisor*. Kate Rachstein, *Typesetting Services Supervisor*.

Patrick J. McGovern, *Publisher*. W. Walter Boyd, *Associate Publisher*.

Subscription rates are: $9 for one year, $16 for two years. Add $1 per year for Canada; $4.50 per year for Foreign. Please send all editorial and subscription material to: COMPUTERWORLD, 60 Austin St., Newton, Mass. 02160. (617) 332-5606.

BPA Membership Applied For



AT&T's Joseph Rott makes a modification to a circuit-order sketch based on information retrieved via the terminal.

AT&T Computer Speeds Installation of Circuits

CINCINNATI, Ohio – New, long-distance telephone circuits will be operating months – even years – sooner because of a major computer installed here by American Telephone and Telegraph Co.

Engineers in the corporation's circuit-layout engineering office say the computer will eliminate more than one million follow-up telephone calls previously required to design and produce new, long-distance telephone lines.

Robert Cooley, AT&T's data processing manager here, said, "The computer is the basis of a Network Information System (NIS) that will eventually enable hundreds of engineers and technicians all over the country to find out, within seconds, the status of any new circuits. Initially, several groups of engineers and technicians in Cincinnati will use the computer here."

A typical inquiry might be from a circuit-design engineer determining whether equipment for a particular circuit has been built.

The engineer sits down at a CRT terminal and enters his request. The computer retrieves the information and flashes it on the screen. Upon request, the computer also will print a hard copy of the information.

If the engineer wants to change the information, he types corrections which subsequently appear on the screen in the proper position.

"Having immediate access to such information will eliminate communication slippages and paperwork inefficiencies," Cooley said. "We also will be able to plan more efficiently for additional circuits to meet growing telephone needs."

Since Cincinnati is AT&T's national center for interstate circuit design, use of NIS will largely be centered here. Seventeen of the IBM 2260 terminals are already in operation. Sixty more units may be scheduled within the next year.

"The information stored in the 360/50 here," Cooley explained, "is updated constantly from records being processed at AT&T's office in White Plains, N.Y. A large computer there is fed up-to-the-minute information on every working interstate circuit in the U.S., as well as those under construction or consideration."

As updated information is received at White Plains, it is recorded in the computer and transmitted via telephone lines to the computer here for access through NIS.

Circuit-design engineers are constantly looking at circuit-use patterns across the country, in an effort to stay abreast of the growing need for telephone service.

Series on Computers and People Produced by Educational Station

By Peter L. Briggs
CW Staff Writer

BOSTON- A new radio series on the impact of computers on people's daily lives and their uses in business and science was begun June 15 by the National Association of Educational Broadcasters under the auspices of National Educational Radio.

The old motto, found on most IBM-card type bills and payment cards, "Do Not Fold," (spindle, or mutilate) is the title and the theme of the 16-week series produced by "Jiffy" Johnson for the University of Illinois' educational station, WILL, in Urbana, Ill. She is a member of the station's programming staff.

Locally, the series is being run Sunday nights on WBUR, Boston University's radio station, but complete national schedules are available by contacting WILL.

The first program dealt with the terminology and concepts used in binary/digital and analog computers. The terminology was complex, but the explanations and anecdotes were very well done, and most amusing, several listeners told CW. Many well-known people in the industry are scheduled to take part in the series.

The next segment is on the use of analog computers in science and business.

Membership Votes Politics Out Of ACM's Official Operations

NEW YORK – Politics was ruled out of ACM official operations as a result of the membership vote on one of two questions of importance. The ballots were counted last week.

However, the subject seemed unlikely to rest quietly because a very substantial minority (20%) voted in favor of changing the constitution to allow political stands and an even larger minority (35%) voted to boycott Chicago in retaliation for the police activities during the Democratic convention.

On the question of changing the constitution, 2059 voted "yes" and 7938 voted "no." On the question of Chicago, 3457 voted "yes" and 6460 voted "no." About 40% of the society's membership cast ballots.

Stronger Than Straw Vote

The Chicago vote followed quite closely the straw vote of the council, which had seven voting "yes," 13 "no," and three not voting. But the strength of the members favoring political involvement was twice what might have been expected from the council straw vote which showed two in favor of revising the constitution and 19 against.

A number of people have objected to the speed with which the votes were put to the membership without what they felt was a reasonable amount of public discussion. The speed was actually occasioned by a petition presented at the December council meeting which called for the ACM to take a position against the Vietnam War. The council bypassed the petition and instead instituted the question of importance.

The Democratic convention in Chicago and its connection with the ACM had a longer history. It had originally been decided to hold the 1969 ACM conference in Chicago at the time the Democratic convention was held. However, Anthony Oettinger, then ACM president, in a one and a half hour telephone call with the previous year's council members, had the conference moved to Las Vegas to prevent possible problems.

Bills on EDP Damages Die As Legislature Adjourns

ST. PAUL, Minn. – A bill that could have made it legal to sue a data processing service organization for damages resulting from EDP processing of an individual's records has died in committee.

Senate File 433, introduced by State Sen. William B. Dosland, provided, in part, "Whoever is injured in person or property as a result of an error made by a computer or as a result of the keeping of records by automatic data processing has a right of action against any person maintaining or utilizing such computer or ADP equipment which proximately caused the injury for all damages sustained . . . ."

The bill was still in committee when the legislature adjourned. It is anticipated that a similar bill will be introduced next session.

A nearly identical bill, House File 104, was introduced by State Rep. Douglas Sillers.

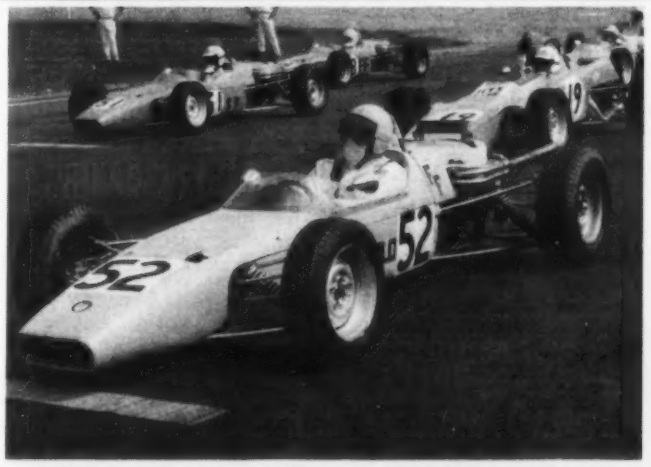
Banks Very Vulnerable

Banks have expressed the feeling that it could make it "economically prohibitive" for banks to engage in EDP for correspondent banks, as well as for normal processing.

Precedents

Two court cases recently have been brought against companies for similar damages and have been won by the plaintiffs.

State Sen. Kelton Gage was a member of the judiciary committee considering the bill. His law firm won a $480,811 award for a client, when IBM's Service Bureau Corp. was ordered to pay damages for allegedly misrepresenting the capabilities of an inventory control system. SBC has appealed.



Bob Ziegel readies to race CW's car at SCCA National Championship races in Thompson, Conn.

CW's New Race Car in Stiff Competition

NEWTON, Mass. – *Computerworld*'s new race car, a Crossle 16 F, Formula Ford, built in Northern Ireland, is set to race next for the national championship at Lime Rock, Conn., July 5.

Formula Ford is a new class in the U.S. this year. It is intended to provide highly competitive, low-cost racing.

The engine is essentially a stock English Ford Cortina powerplant, and the cars are limited to production wheels, four-speed transmissions, and many proprietary suspension and braking components.

Its top speed is from 130 to 140 miles per hour, and its weight is about 880 lb.

Computerworld's New England regional sales manager, Robert Ziegel, is the driver. In his first race at Thompson, Conn., Bob finished fifth of 18 starters and was beaten by only one private entrant. The first three cars to finish were factory sponsored by various manufacturers.

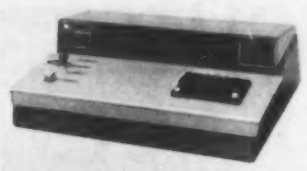
In his second race at Lime Rock, Conn., Bob finished third out of 33 entrants. He led the field for half the race, but according to Bob, he kept "drifting out on that marshmallow track." It had poured rain all that morning.

The remainder of the July schedule for the CW car is July 13, Thompson, Conn., for the area championship and July 27 at Lime Rock, Conn., for the national championship.

Credit Check System Said to Speed Sales, Reduce Risk

COLMAR, Pa. – A retail credit authorization system that features inexpensive units to display various types of answers to a clerk's inquiry is operating successfully in several stores.

Advantages claimed by the manufacturer, Credit Systems, Inc., include positive identification of risks to be referred to the credit department, greatly speeded clerical functions, and virtual removal of "floor limits."



The system is called Credit-Chek. It consists of inexpensive devices at counter locations and a central processor unit that can take daily input of doubtful account numbers from the central credit function.

The processor first uses a check digit technique to provide protection against forgeries. It can look at the number of daily transactions in every active account, and it can be programmed to flag purchases which bring a customer's balance over a preset limit.

It can also take into account the current or past-due nature of accounts, as instructed by the credit department, the company says.

Recently developed hardware also allows the credit function to input either complete or specific account updates on punched cards, paper tape, or magnetic tape, according to the company.

The counter units, which contain light displays, cost $10 per month over a five-year lease period.

A processor said to be capable of handling 100,000 accounts has a lease price of $1,200 per month.

Cost of other peripheral units, including multiplexors with the claimed capability of handling about 150 counter units, will vary according to configuration.

Credit Systems, Inc. can be reached at P.O. Box 105, Colmar, Pa. 18915.

New Products

CRT Terminal

A "Standalone" version of the NCR 795 data display terminal has been announced by the National Cash Register Co.

The new terminal has its power supply, logic, keyboard, and screen in a self-contained unit. Designated as the NCR 795-620, it offers a cost advantage to the user who requires only a single CRT, the company said.

NCR also announced that it will market for the first time a standard teleprinter for use with its 795 data display systems. Previously, NCR users who needed hard-copy capability had to acquire teleprinters through other suppliers.

The NCR 795-620 "Standalone" terminal is priced at $8,750. It has a monthly rental of $250. The teleprinter, the NCR 795-640, sells for $1,750 and rents for $50 a month.

Higher Speed Modems

International Communications Corp., a subsidiary of Milgo Electronic Corp., has announced its Modem 5500 series of high-speed data sets.

Modem 5500/96, the first data set in the series, transmits computer information at the rate of 9600 bits/sec. Based on ICC's unique narrow-band design, the new unit is said to be capable of operating at 9600 bits/sec over voice-grade, type C2 (4B) telephone lines without requiring complex automatic equalizers.

Modem 5500/96, priced at $11,500, is aimed at applications – including the time-sharing industry – which depend heavily on maximum exchange of information. ICC is accepting orders for December delivery.

The company's address is 7620 N.W. 36th Ave., Miami, Fla. 33147.

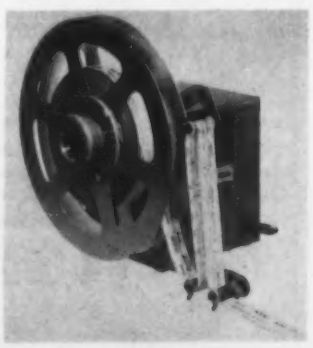
Tape Monitor

A device that monitors the passage of paper tape, both off and back on the reel has been announced by Cycle Equipment Co.

Called Tape Minder, it releases tape only on demand (tension) and spools it back when that part of the device senses slack. Both parts of the unit are said to shut off automatically upon lack of demand.

Speeds range from 23 char/sec to 700 char/sec, the latter requiring a NAB hub. They are fully field tested, the company says.

Prices range from $146 to $186, with reels supplied at both prices. The will be available in July.



The company's address is P.O. Box 307, Los Gatos, Calif. 95030.

Mag Tape Cleaner

A magnetic tape cleaner that combines conventional light scraping techniques with vacuum-like cleaning has been announced by P.G. Foret, Inc.

The MTC-100 magnetic tape cleaner is intended for the periodic removal of the dust and dirt which normally accumulate on tapes in use.

The vacuum-like process is said to be made effective by vibration, which loosens the dirt and allows it to be sucked out.

The supplier's address is 60 Union Ave., Sudbury, Mass. 01776.

Tape Winder

A series of motorized perforated-tape winders, with take-up speeds of up to 24,000 codes a minute has been announced by Robins Data Devices, Inc.

The new units feature slip clutches that automatically adjust speed, tension, starting and stopping, permitting intermittent operation without harming the tape or reader. Tapes may be up to one-inch wide.

Model DWM-2B, at $80, and Model DWM-3B, at $85, have six- and eight-inch flanges, respectively. Both have a clip threading arrangement on single-flange reels that tilt back slightly to secure the tape during winding.

Model DRM-5B, at $85, has a shaft that accommodates any size reel with a half-inch inside diameter. For other reel sizes, hub adapters are available.

The company is located at 15-18 127th St., College Point, N.Y. 11356.

Punched Tape Splicing

Self-sticking preperforated Quik-Splices for fast jam-proof splicing of punched paper tapes are a new product of the W.H. Brady Co.

Of polyester film, opaque Quik-Splices are one-inch long, perforated in all fields for standard eight-channel punched tapes employed in systems with either photo-electric or mechanical readers.

The 0.0035-in. patches, with nonoozing adhesive, are said to pass smoothly and cleanly through equipment without jamming or sticking, and to bond firmly to treated or untreated paper tapes as well as mylar, laminated, or aluminum tapes.

Literature and samples may be obtained by writing to W.H. Brady Co., 726 W. Glendale Ave., Milwaukee, Wis. 53201.

Data Processing Salaries at a New High, Survey Finds

ELMHURST, Ill. – A survey has revealed that salaries for personnel employed in the electronic data processing field are at a new high.

The annual study, just released by *Business Automation*, reports weekly salary data for 22 different EDP jobs and covers 2,367 installations totaling some 82,500 employees.

The Manager of All Data Processing, which normally means the top man in the computer operation, earns a nationwide average of $303 per week. This amounts to an 8% increase over the 1968 figure. Top average salary for the same job, on a city-by-city basis, was $349 per week, as reported by New York City. Second highest weekly average of $338 comes from Washington, D.C. The lower ranges were reflected in the Jacksonville, Fla., average of $263 and the Portland, Ore., figure of $265. Regional areas also point up differences in salary structure. The EDP manager in the East South Central region, for example, averages $284 per week, as opposed to a Middle Atlantic average of $314.

In addition to the Manager of All Data Processing, figures for the Manager of Systems Analysis job indicate that this position pays an average of $280 per week nationwide. The Manager of Systems Analysis normally holds full responsibility for the step-by-step study of procedures involved in the collection, processing, and evaluation of information about the company.

Another key position, that of Manager of Programming, pays a nationwide average of $251 per week. This position entails responsibility for all programmers in the department who are preparing instruction sequences for the computer.

The Manager of Computer Operations is in charge of all computer operators and earns a weekly average of $211. Among the other positions reported on are Manager of Unit Record Equipment, $176 weekly average; Tape Librarian, $115 average; and Keypunch Supervisor, $131 per week, average. Lesser positions within these and other departments are also detailed in the survey.

"Our survey turns up some interesting projections," states Arnold E. Keller, editor/publisher of *Business Automation*. "If we use the average number of employees per installation at 35.4, as indicated by the study, and today's generally accepted estimate of some 53,000 computer installations, that means there are some 2 million people directly employed in the nation's EDP operations."

Unions are becoming increasingly aware of the breadth of the computer community, as reflected by the fact that some 206 firms report union membership among the EDP group. Union activity seems to be concentrated in the lower-end positions, as reflected by figures indicating that 91.3% of Key Punch Operators are affected by union membership in these firms, 73.8% of Computer Operators, and 63.1% of the Unit Record Equipment Operators.

Educational requirements in EDP are also highlighted by the salary study. Among EDP Managers, 45.5% have a college degree, 39.4% of the Systems Analysis Managers have a college degree, and of the Programming Managers, 26.3% are college graduates.

Weekly salaries for the EDP manager's job also fluctuate according to size of installation. In firms where monthly dollar computer rental costs are under $3,000, the EDP manager averages $228. In firms where the dollar monthly rental exceeds $50,000, the manager averages a weekly salary of $395.

Still another aspect of the survey reveals that 40% of all EDP installations report to presidential and vice-presidential levels – again, up slightly from last year's 39%. A majority of systems analysis and programming operations, it is shown, continue to report to the EDP manager.

Concerning the leasing aspect of the industry, computers and related equipment rented from the manufacturer total 74.8% as opposed to the 22.1% purchased outright. Participants renting from a lessor rose to 16.5% – a considerable increase over last year's 9.7%.

2 DP Scientists Get Nato Award To Study Abroad

WASHINGTON, D.C. – American computer scientists have been awarded North Atlantic Treaty Organization (Nato) Senior Foreign Fellowships in Science, the National Science Foundation and the Department of State announced today.

The scientists will study new scientific techniques and developments abroad under a program designed to foster interchange of information among the member nations of Nato. With the cooperation of the Department of State, the National Science Foundation administers the fellowship program for U.S. citizens.

The fellowships enable universities and nonprofit scientific research institutions in the U.S. to send senior staff members to research and educational institutions in other Nato nations or in countries cooperating with Nato. This serves to strengthen the U.S. institutions' scientific work at the graduate or advanced level.

Engineering Institute To Offer DP Course

CLEVELAND – The Cleveland Engineering Institute, Ohio's largest engineering drafting school, will begin teaching computer sciences this fall.

Charles N. Zelenko, institute president, said the decision to enter this field was based on "great demand for a quality school to train young people in the rapidly expanding data processing field."

Classes will be held at the institute.

INTERCOMP PRESENTS 1130/ACCESS*

THE DISK STORAGE SYSTEM for the IBM 1130 user

Without reprogramming, your IBM 1130 Computer will ...

- **Compile...up to 35% Faster**
- **Assemble...up to 45% Faster**
- **Sort... up to 80% Faster**
- **Load...up to 120% Faster**

Now, your 1130 Computer can access five to fifty million bytes of information on IBM 2311 compatible drives. With INTERCOMP ACCESS, your 1130 retrieves this information in under 50 milliseconds average . . . and without reprogramming.

* Patent Applied For

INTERCOMP ONE CENTRAL PLAZA CAMBRIDGE MASSACHUSETTS 02139
617-864-4700

Gentlemen:
Please rush all data on your 1130/ACCESS Disk Storage System.

NAME _____ TITLE _____
FIRM _____
BUSINESS ADDRESS _____
CITY _____ STATE _____ ZIP CODE _____
TELEPHONE _____ EXT _____
☐ Please arrange for a demonstration.

- **Up to Fifteen Times Your Present Access Speeds**
- **Five to Fifty Times Your Present Storage Capacity**
- **No Reprogramming or costly Conversions**
- **Nationwide Service**
- **Demonstrations Now**

INTERCOMP • One Central Plaza
Cambridge, Massachusetts • 02139

Editorials

Unnoticed Revolution

In the pages of this week's CW we see details of yet another type of punch card replacement. This case is interesting because, like a number of other items now on the market, it makes use of computers to help the computer input problem. It serves a particular specialized area through the use of Cobol and through the use of tape cassettes. These allow for unusual flexibility in the placing of the key punch operations and in the flexibility of computer connections. This is good.

From a marketing point of view, the system has to find its own particular segment of the market because recently a number of other systems have been produced and successfully offered which handle other more or less specialized areas. Indeed the sheer number of these offerings has removed much of the news value from their announcements.

This is a pity because it may have obscured another message. It may have obscured the fact that you usually don't get a whole rash of announcements and deliveries unless there is a very good and worthwhile commercial benefit to the user from them. And so it may have obscured the fact that many people carry on with equipment that has been made obsolete by newer equipment in the market place and yet do not realize it. It obscures the fact that a revolution has occurred.

If your installation has not checked out its data input policies and procedures and the costs of them during the past two years, then with due respect we suggest that you may well be missing the chance to benefit from the revolution. This may be our fault because of the fact that we no longer put each announcement in 43-point type on the front page. The headlines look much milder and now are found inside the paper. But whoever is at fault, it is not advisable to overlook revolutions. If you have not been looking, we suggest that you do so.

We are sure that you will find it worthwhile.

Let's Try Cooperation

The actions of standards committees are often of great importance to computer users – and this applies to more than the actual standards that are produced. There is only so much voluntary labor available, and its usefulness is of general interest. X3 has denied the general public, no matter how interested, access to its meetings and unfortunately has recently been completely misrepresented by the sponsor, Bema, about its actions on PL/I.

Despite this, the policy now proposed would permit Bema to continue its stranglehold on effective communications and to continue the undesirable situation in which standards are a plaything of a small clique.

We agree that a new public-relations policy for the standards operation is urgently needed, and we urge that it be one that genuinely expedites timely and accurate publicity and creates special awareness and increased participation in the voluntary standards program. In the past, we have offered to collaborate in an attempt to reach a reasonable understanding which can help achieve these goals. We offer it again now.

"Everybody's Got Bugs - So Why Worry?"

Letters to the Editor

Poor Systems Design Work Seen as Blot on Profession

I have just finished reading your article, "Errors Nearly Elect Candidate," in the June 11, 1969, issue. This is still another example of inexperience of untalented system designers not being able to see a forest for the trees.

There is no question in my mind whatsoever that the "zero insertion" feature of the 029 keypunch is completely misunderstood by users of data processing systems. The only justification for using the left zero insertion feature of this machine is when the data must be processed by older EAM equipment. When using a general-purpose computer, there is really no justification whatsoever for not providing left justified numbers to be keypunched where remaining positions in the data fields are left blank. An extremely simple algorithm in a small subroutine can be used to right justify the number and insert leading zeros before processing. This technique can materially increase keypunch efficiency with a totally negligible expense in the computer operating time.

It's really a shame that this kind of gross mistake can be made by members of what we would like to call a profession.

On a similar note, on page 15, your short item entitled, "Program Prints Letters Two-Up and Saves Time" – Hell, don't they all? Any general-purpose letter program which does not print letters two-up is obviously being written by "professionals" without regard to total utilization of available facilities.

I realize that this letter is somewhat irate, but I am beginning to wonder abour our ability to mature as a profession if this kind of "improvement" is taken as a major step forward.

Jerry L. Ogdin

Washington, D.C.

MIT Defense Research Cut Seen as Face-Saving Move

Your article reporting MIT's plan to reduce defense related computer research at its Lincoln Laboratories [CW, June 18] comes just at the time a *Washington Post* survey on performance of modern weapons systems has been widely reprinted in newspaper ads throughout the country.

The survey cites three systems as particular "disappointments": the Dew line system, the Sage system, and Bmews (Ballistic Missile Early Warning System). All of these systems were designed at Lincoln Laboratories.

Perhaps MIT is withdrawing from defense research to save face. On the other hand, it may feel that the best way to serve the country is to not produce any more "disappointments."

Ian Martin

Cambridge, Mass.

Letter Crossed Paths With Story He Sought

I am delighted with your fine coverage of the SJCC held in Boston. However, I seemed to have missed completely any mention of the American Bankers Association Data Processing Convention held in Chicago, May 18-21. In view of the fact that the banking industry is one of the largest users of Computer Systems, I feel that *Computerworld* missed a "Golden Opportunity" to make many fine friends.

Kim Amann
Medium Systems Support

Burroughs
Detroit, Mich.

See "Rair Services Seen as Key to T/S Future," CW, June 18. Ed.

"Leave the Blinds Up – You Never Know When a Talent Pirate From a Computer Software Agency Might Be Spying on Us . . ."

Challenges to Computers — Part 1

Are General Purpose Computers Being Surpassed?

Introduction

At a time during which it appears that computers are becoming almost all-powerful in the life of the nation, and when growth curves for the industry seem to be destined to break record after record, it is worthwhile to take the time to see what the potential challenges to the industry are.

In this article it is suggested that we may have overlooked the real meaning of the word "computer" and that the special purpose computer, which has been with us from the start but which has never played a significant role in the computer industry, may be about to seriously threaten the role of the general purpose computer.

This article was extracted in part from a speech recently given by Alan Taylor, editor of CW, to the National Society of Controllers & Financial Officers of Savings Institutions.

Computers have a history of success, and this is particularly true of the general purpose digital computer. Indeed, although there are other types – special purpose computers which handle specific jobs and analog computers which deal in terms of voltages rather than numbers – the success of the general purpose computer has been so great that it has taken over the meaning of the word "computer." The layman and the Wall Street specialist think of computers as *always* having been general purpose, always having been digital, unless specifically told otherwise.

Handles Undefined Problems

The success of the general purpose computer comes in large part from the fact that it, and it alone, can handle problems that have not yet been thought about. You can make a general purpose computer and do all the engineering and ready its operating systems before really thinking about the problems that it is to solve. As a result it is economically practical to mass produce computers, because they are not specialized to specific applications, and, even more important, it has been found to be practical to use them.

Risk Eliminated

The capability of using the computer, of knowing that the computer is going to be able to be of use, is obviously a key item. Large firms do not put down thousands and millions of dollars on risks; they need some form of security, and the general purpose character of a present day computer provides them with security in an unexpected and often unappreciated manner. It provides them with the security of knowing that they can probably put an application onto the computer even before the details of the application are known.

The simple fact is, as the experience of the past 20 years has told us, that there are very few, if any, manual applications in industry that are understood well enough to be able to instruct a system analyst or a programmer *ahead of time.*

Reasonable Problem

This is, of course, very reasonable. The applications concerned are generally ones which are already in use with human supervision. Naturally exception cases are not predefined but are simply noted and referred to management for decision. This is not practical in any automated system, and so the provision of automated systems which could not be reprogrammed to take into account newly discovered characteristics was bound to end in failure. And in fact a number of such attempts using the special purpose computers for this purpose did end in failure.

This was perhaps the key reason for the success of the general purpose computer in the market place. *However, this reason is no longer valid.* It is no longer a defense of the general purpose computer against the possible inroads of the special purpose computer.

Applications Now Defined

The reason it no longer holds valid is because many applications are now automated. They are defined thoroughly; they are running without the manual supervision. It can be determined as to what they mean. As a result of this, it is now possible in suitable cases to give a firm the security of knowing that it really does understand its application and that it really can expect the system to perform properly.

Of course, at the moment these automated systems are themselves on general purpose computers but this is no real bar to those being transferred to special purpose computers. Computers have got to be updated, and there are many other uses to which the general purpose equipment can be put. It is therefore quite practical to expect special purpose computers to be able to compete with the general purpose computers for these applications and not to be disqualified by the lack of knowledge of them as they have been for the past 10 years.

May Be Economically Possible

However, the question is not only whether they are able to compete. Before they can be taken seriously, it must be considered whether they can economically compete, and here again it suddenly appears that the answer is yes, even though only marginally yes. This change has arisen because until recently we thought that a specially programmed computer must have an unflexible program – and we knew that an unflexible program would not sell.

Now it turns out that the basis of this assumption is invalid. It turns out that we were looking the wrong way at the special purpose computer and that in fact special purpose computers can provide for the flexibility of operation which is the lifeblood of competition.

There are at least three different methods which allow us to provide computers that are preprogrammed and yet are flexible. The oldest one is the terminal computer like the Burroughs TC500. This has a restricted area of interest and so is able to talk and accept simple instructions like "Take a letter, Miss Jones" easily and simply. And because in these systems you choose to use phrases like "Take a letter, Miss Jones" and other ones that mean something to the user, you can avoid the intricacies of the "add A to B, test C, jump to position 17" horrors of the old computers. The TC500 uses half of its capability to provide the simple repertoire of understandable instructions, and by changing them around you are able to decide what you want the system to do. It is a preprogrammed computer, but it can take you many places. You can retain the flexibility that you need.

The TC500 has already been delivered. The next model that I draw to your attention has not yet been delivered but you may know of it. It is the Viatron System 21. Again the programming is done ahead of time. Again the program accepts as input a number of powerful, understandable instructions. And again, you can make your system flexible and different from that of the man next door. You can change your system when you want just by changing the phraseology. That has not yet been delivered, but it can be seen at the different shows in the form in which you will use it.

A Memory Man's Ideas

The last one that I draw to your attention is the system of weaving a control memory, and some, such as Isaac Auerbach of Auerbach Corp., believe that this is the major route to the future. At the Spring Joint Computer Conference, he told CW that this was the area that was coming on strongest. He should know. He was building memories for many years before he started his own series of companies and he is still a memory man at heart. He says that you will be able to take a Cobol program which runs the application you want on a general purpose machine and use that as a definition of your need. Having defined your need in a machine readable form, you will be able, with today's technology, to take that and use it to weave your special purpose computer.

They Can Be a Challenge

If any of these items work out, then special purpose computers can be produced economically, run more flexible programs, and handle those applications which have already been purified. To assume that special purpose computers are going to stay in their own back yard and not challenge the general purpose computer is an assumption that can be based on history but no longer on technical facts. It is therefore a dangerous assumption for computer people to make.

IBM Under New Attack, This Time By Employees

WHITE PLAINS, N.Y. – After being accused of various offenses by outside firms and by the U.S. Government in recent antitrust suits, IBM is now apparently under internal attacks for allegedly maintaining double standards.

In an employee publication, the corporation, responding to an accusation that it had different standards for employees and for the corporation, described at length the company policies on moonlighting.

The double standard accusation was based on the argument that the company corporately purchased supplies from other computer manufacturers or related firms such as General Electric, RCA, and Scientific Data Systems while forbidding employees to moonlight for IBM customers. The argument was that while the employee could be accused of conflict of interest by providing support of competitive activities, IBM could provide such support without being considered in conflict – and that this was a double standard.

In its response, IBM distinguished between its activities in renting cars (from RCA's Hertz) or purchasing GE motors and an employee's position working for an IBM customer. IBM said that such moonlighting would "inherently" involve a possible conflict of interest because his business loyalties would necessarily be divided between two employers who had a business relationship with each other. This, the company argued, made such moonlighting impossible because an IBM employee only had the right to moonlight when no possible conflict of interest was involved.

If you earn 10K-a-year and spend more than 130 seconds a-week looking for your boss' copy of Computerworld,

you're wasting his money.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
SIXTY AUSTIN STREET, NEWTON, MASSACHUSETTS • 02160 • TELEPHONE: (617) 332-5606

Yes, please send me COMPUTERWORLD for . . .

☐ 1 Year $ 9.00
☐ 3 Years $20.00 ☐ Bill Me
☐ Payment Enclosed

AR

Name	
Your Title	49
Co. Name	57 79
Address	15 37
City	38 51
Zip Code	2 6 7 8 CW 15 16 17 18 19 20 21 22 23 24 25 26 27

Return to:
COMPUTERWORLD 60 Austin Street, Newton, Mass. 02160

Please Circle 1 Number and 1 Letter:

YOUR TITLE AND/OR FUNCTION?

A. Operational Management (nonengineering)
B. Computer Professional Staff
C. Corporate Officers
D. Engineering Management
E. Engineering/Scientific
F. Production/Maintenance
G. Sales/Marketing
H. Other _____

COMPANY BUSINESS:

1. Mining or Construction
2. Manufacturer/Computer or Data System
3. Manufacturer/Other
4. Utility
5. Wholesale/Retail
6. Finance
7. Consultants/DP Services
8. Business Service (except DP)
9. Educational/Medical/Legal
10. Government/Military
11. Other _____

When you consider that Computerworld costs only 17.3¢ per issue with a one-year subscription, it doesn't make sense for you to spend your time looking for someone else's. Especially your boss'.

Ok, you say, you don't spend two minutes looking for Computerworld each week. The secretary drops it off at your desk when your name comes up on the list.

But how old is your copy when you get it? A week? Two weeks? If it's more than two days, you've defeated our entire purpose in life: to bring you all the news of the computer field as it happens. Not a month later. In fact, we're the only publication that does this — the only weekly for the EDP field. But you know a lot about us already. After all, you're reading Computerworld right now.

We're sure that a current issue of Computerworld will help make you more efficient each week. So do us both some good. Tell your boss that he can save money by letting you fill out the coupon below. If you are the boss, take the time to do it yourself. Just fill in the name of your company and attach your Computerworld routing list. We'll see that everyone on the list gets his own copy. It'll be two minutes well spent.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
SIXTY AUSTIN STREET, NEWTON, MASSACHUSETTS • 02160 • TELEPHONE: (617) 332-5606

SLAY the many headed dragon

CROSSTABS

STATISTICALLY POWERFUL PACKAGE, REPORT-ORIENTED, EASILY LEARNED, AND REQUIRING NO PROGRAMMER

WHAT IT IS

NEEDS NO PROGRAMMER . . . HAS MANY APPLICATIONS . . . EXCELLENT REPORTING TOOL . . .

CROSSTABS . . . for data extraction, analysis and reporting . . . the most powerful and flexible cross-tabulation package available for the IBM System/360.

Users in finance, research, personnel, marketing or operations management, who need not be programmers, automatically create special programs tailored to current reporting or analysis needs, through simple control statements. Each CROSSTABS run then produces statistical reports, appropriately titled, labeled, and spaced, in easily readable cross-tabular format.

WHY IT'S BETTER

NO CHANGES NEEDED . . . LEARNED IN 3 HRS.

CROSSTABS requires no changes to current files or operating system. Report-oriented, it is designed for direct use by the individual to whom the final information is important. For this reason, its control statements are simple enough to be mastered by a nonprogrammer within three hours. Yet it is flexible enough for expression of highly complex data retrieval and manipulation operations.

WHAT IT DOES

OPERATES ON ANY INPUT FILE . . . IDEAL FOR SURVEYS . . . 21 STATISTICAL FUNCTIONS . . . HANDLES BAD DATA . . .

CROSSTABS operates on any type or format of data file, computes relative frequencies, indices, pertinent statistical measures. Processes all types of complex weighting factors and automatically produces neatly labeled reports.

Along with its capability to produce multidimensional crosstabulations of any degree of complexity, CROSSTABS offers great efficiency in the use of core storage and machine time.

Twenty-one frequency and percentage options for calculation and display are provided by CROSSTABS. An important feature is CROSSTAB's ability to recode data at the same time it processes a file. In addition, procedures exist for handling records with missing or invalid data.

WHAT IT COSTS $260/MO.

Short-term rental starts at $260 per month with attractive, purchase option credits earned toward a purchase price of $4,500.

Developed and Maintained by

CAMBRIDGE
COMPUTER ASSOCIATES, INC.
CAMBRIDGE, MASS. 02139

DOCUMATIC® / for 360 RPG

WHAT IT IS

Total Program Documentation — English language documentation, not codes; understandable programs, not questionable jargon; a programming application completed, not a job in the works now occurring at scores of DOCUMATIC installations.

Training Aid — DOCUMATIC users have utilized the system to train junior programmers faster with the English language description of what they have written.

Run Book — DOCUMATIC output is used today as the basis for their run books; run books that get away from scraps of paper and an operator or programmer's memory.

Conversion Aid — DOCUMATIC users are upgrading their computer hardware at a cost lower than ever before possible. Card applications are being converted to tape and disk so rapidly that complete conversion has been accomplished before hardware delivery. Users upgrading to Model 25's and 30's have gone from RPG source to COBOL source with minimum difficulty.

Accurate Documentation — Installations have been able to replace their original systems specifications with a DOCUMATIC system run to produce an accurate up-to-date picture of each of their applications. This facility has provided their management with the security of knowing that the job can go on, even when their Data Processing Manager finally takes his vacation.

WHY IT'S BETTER

Standardized Documentation — The knowledge that it is no longer necessary to decipher manual documentation and the fear that the documentation was lost are no longer present in DOCUMATIC installations. Any time standardized documentation is needed all that is required is three minutes of computer time.

Updating Less Error Prone — DOCUMATIC users have eliminated the costly rerunning of updated production programs. Problems such as overlayed data fields, missing credit signs, etc., which RPG does not detect are vividly pointed out by DOCUMATIC before a program goes into production.

Minimizes Redocumentation Costs — DOCUMATIC users have realized substantial dollar savings in program maintenance because of the availability of superior documentation. Program modifications are being effected 100% faster. Future modifications will be just as easy since redocumentation with DOCUMATIC takes only a few minutes.

Audit of Programs — Financial management and corporate auditors can breathe easier at a DOCUMATIC installation with the ability to readily read English translations of RPG financial disbursement programs.

WHAT IT DOES

Program Optimization — DOCUMATIC users are modifying their RPG programs to provide faster thruput and smaller programs. They've been able to accomplish this through DOCUMATIC which produces output in a manner similar to the RPG compiler (pointing the way to optimal program modifications).

Debugging Aid — DOCUMATIC users are saving thousands of dollars a year in using this system to DEBUG their programs. RPG compilations during program testing have been cut in half.

Encourages Standard — Uniformity of file names, data descriptions and modular programming are indispensable in any data processing installation. DOCUMATIC systems output is being used as the first step towards the establishment of these installations standards.

WHAT IT COSTS $40/MO.

Short term rental starts at $40 per month, with attractive purchase option credits earned toward a purchase price as low as $1,600.

Developed and Maintained by

Data Usage CORP.
Computer Software Architects
FORT LEE, NEW JERSEY 07024

UTILITY-CODER/360

FOR THAT WORK YOU DIDN'T PLAN FOR . . . HAVE NO BUDGET OR STAFF FOR . . . AND THEY WANTED YESTERDAY!

WHAT IT IS

SIMPLE . . . FLEXIBLE . . . EASILY LEARNED . . . SUITED TO "ONE-SHOT" AS WELL AS "REPETITIVE JOBS" . . .

UTILITY-CODER/360 is the easiest and most flexible language for improving use of the IBM System/360 in a wide range of data processing applications.

Its language consists of English words, abbreviations, and a few symbols . . . each element of which is basically self-explanatory and easily remembered. It can be quickly learned and easily used by inexperienced as well as veteran programmers.

WHY IT'S BETTER

QUICKY PROGRAMMED . . . FAST EXECUTION . . . FEWER RE-RUNS . . .

UTILITY-CODER/360 is already in widespread use and the results have been exceptional. Programming time has been reduced dramatically. Re-runs have been cut substantially. Efficiency of operation has improved significantly. On particular jobs, current figures show savings running as high as 60% versus conventional-type software systems.

WHAT IT DOES

FILE MANAGEMENT . . . DATA HANDLING . . . RETRIEVAL . . . REPORT WRITING . . . AND CONVERSION . . .

UTILITY-CODER/360 has broad capabilities for performing many types of file management, retrieval, and conversion operations, as well as report writing. It provides quick and accurate control for: Creating, maintaining and editing data on any medium; Retrieving subsets of files that satisfy tests of any complexity; Generating printed reports or summaries in any format; Converting to System/360 from any other computers; Algebraic computations; Converting data from one representation to another (character, packed, binary, hexadecimal).

WHAT IT COSTS $180/MO.

Short-term rental starts at $180 per month with attractive purchase option credits earned toward a purchase price of $3,500.

Developed and Maintained by

CAMBRIDGE
COMPUTER ASSOCIATES, INC.
CAMBRIDGE, MASS. 02139

Through our national network of sales representatives we are capable of assisting with many of your software problems. Please feel free to contact us with a software problem of any sort. We'll be pleased to work with you in its solution.

AVAILABLE FROM:

BOSTON IBCS
COMPUTER SOFTWARE CORP.
15 School Street, Boston, Mass. 02108 • (617) 227-8634

Offices and Sales Agents in:
Boston, New York, Buffalo, Toronto,
Washington, Philadelphia,
Chicago, Milwaukee, St. Louis, Denver, Los Angeles,
San Francisco, Seattle, Alaska, Hawaii.

A BOSTON COMPUTER GROUP COMPANY

Poison Control Center Is Computerized by Doctor

KANSAS CITY, Mo. – The lives of many people, particularly children, may be saved as a result of work done by Dr. Vernon Green, Children's Mercy Hospital, in computerizing the lists of poisons, their symptoms, and their antidotes on a time-sharing terminal.

Always Emergencies

"Poison cases are always emergencies, and minutes lost in trying to identify the proper antidote can mean lost lives," Dr. Green told *Computerworld* in discussing the reasons for developing the system.

He also pointed out that when the hospital was a teaching hospital, the system was a great aid in teaching toxicology to nurses and interns.

"I developed the system partially as a means for self-preservation," Green said, "just to get a little sleep. My calls for night emergencies have been cut down from several per night to two or three per week now that the system is working!"

The development of the system included hiring a full-time clinical toxicologist at Mercy, and the establishment of a poison-control center within the hospital.

A direct computer connection between the emergency room and the computer can save many precious minutes when a child is brought in for treatment.

The system now contains all pertinent information about the 300 drugs most commonly found in the home.

The next stage is to include information about the 1,000 most commonly used household products, such as bleach, cleansers, and insecticides.

To compile this list, Dr. Green has toured several supermarkets and made lists of products sold. The system can eventually handle about 30,000 items.

Not Computer Alone

"The computer doesn't rule out clinical judgment or laboratory findings. It remains for the house physicians to evaluate the seriousness of a case. The computer just saves time, and the quicker a poison victim receives treatment, the more likely his life will be saved," said Dr. George Wise, director of Mercy's poison control center.

According to Dr. Henry Verhulst, director of the National Clearinghouse for Poison Control, "53% of the ingestions (of chemicals) and 42% of the fatalities involved children taking overdoses of medicines. Most of these children were under five years old."

Simple Access

To make use of the system, a nurse simply types in the suspected name of the poison. Within a minute, the computer types back all the relevant information.

In complex cases, Dr. Green has a laboratory for clinical analysis of the ingested poisons, and he uses the computer to facilitate his analysis.

Toxicologist Important

Pointing out the continuing need for a full-time toxicologist, Dr. Green told *Computerworld* about a case in which a child received an overdose of an insecticide carelessly left in a milk carton in the home refrigerator.

Dr. Green was called, and he prescribed a massive dose of an antidote.

The attending doctors were appalled by the size of the dosage – 20 times the amount thought to be fatal.

The antidote, atropine (originally used as an antidote for nerve gas poisoning), was administered, and the child lived. Only specialized experience could have accounted for such action.

Expansion plans for the next year or so include installing terminals in other parts of the hospital, many of which have already been using the system by telephoning the emergency clinic.

If discussion of computerizing other poison centers continues, Dr. Green told *Computerworld* that Mercy might become the central clearinghouse for several such hospitals in nearby states.

Big Fish Story

WALTHAM, Mass. – Codon Corp. recently found that CW advertising yielded remarkably straight results. In response to an ad headed "Rapidly growing pond seeks big fish," the firm got a lot of applicants and successfully hired the marketing manager it wanted – Stephen M. Fisch.

Codon forgave him the difference in spelling.

Contract Details, Development Covered in Guide

NEW YORK – A contract development guide recommending what contractual arrangements should be put into contracts has been developed by Adapso, the industry organization for service bureaus.

The booklet, "An Industry Guide of Contract Development," was prepared by Milton R. Wessel, Adapso's counsel, and Ray Herrick, counsel for Fisher-Stevens, Inc., a Clifton, N.J. service bureau. However, it is not intended to be a legal document, J. L. Dreyer, Adapso executive vice-president told CW, but is rather a guide for determining what should be covered in contracts.

Details of contracts are covered, including ones between companies and clients and between companies and their employees. The booklet is divided into four major sections: Contract Survey Statistics, Legal Narrative, Court Experiences, and Contract Samples.

EDP School Problems Are Discussed by Educators

By Patricia Coffey

What type of education is available for those interested in the data processing field?

Where are the schools? How important are they?

What are the problems?

What is the future?

These are some of the questions we asked educators in the data processing field.

Most feel that schools, private and public, vary greatly in educational quality.

Each school must be examined individually, including qualifications of faculty and nature of curriculum and data processing equipment.

Special training of particular importance for data processing workers seems to lie in communications skills, logic, mathematics, and psychology.

Most educators feel that "the more education the better." However, they stress aptitude to the extent that if an individual has an aptitude for programming, without having a college background, he should be given a chance to prove himself.

The key problems in the field are recruiting competent staff and having sufficient access to equipment.

"It's difficult to have a good course because of the serious problems of getting competent teachers," said an education director of a private school. "Because they are competent," he added, "there's a demand for them from large high-paying companies."

Norman F. Kallaus, chairman of the College of Business Administration at the University of Iowa, feels that all students in a university should have a knowledge of the computer and its capabilities.

"But I don't want to be a computer programmer!"

Drawing by Shirvanian; © 1969 The New Yorker Magazine, Inc.

Achievement Exam in Computers and Data Processing Designed

Business and industrial firms, along with two- and four-year colleges, will be interested in an achievement examination in Computers and Data Processing recently developed by the College-Level Examination Program.

The CLEP Subject Examination in Computers and Data Processing is designed as a device for business and industrial firms to use when screening trainee applicants for computer programming positions. It measures an individual's mastery of the basic material on data processing hardware, software, programming, and procedures usually covered in an introductory college-level course of one or two semesters.

Examination questions are designed to measure understanding and application of the elements of unit record and computer data processing. The examination assumes an understanding of terms commonly used by data processing practitioners and a general familiarity with the hardware and software most commonly supplied by major equipment manufacturers. It does not, however, emphasize details of hardware design or of advanced quantitative or programming techniques related to the use of the computers.

The terminology and symbols in the tests conform to the standards set by the USA Standards Institute.

The examination consists of approximately 100 multiple-choice questions to be answered in 90 minutes. Most candidates will be able to read and consider all of the questions in the allotted time; few, however, are likely to answer all of them correctly. It is expected that average candidates will be able to answer about one-half of the questions correctly.

The questions in each segment can be classified under the eight major headings listed below. The approximate percentage of the total number of questions allocated to each listed topic is shown in the right-hand column of the table.

1. Punch card equipment and processing methods	10%
2. Computer equipment and functions	16%
3. Data representation and central processor functions	12%
4. File organization and processing	10%
5. Data processing system design	10%
6. Elements of computer programming	20%
7. Program modification and input/output programming	12%
8. Program debugging, control of errors in data processing, and management of data processing function	10%

There is also an optional 90-minute essay section containing five questions and designed to cover the same subject matter as the multiple-choice examination. The emphasis in this section is on measurement of a candidate's ability to select, organize, and fully, yet concisely, express his knowledge.

A short form of the Subject Examination in Computers and Data Processing, called the "Brief Test," will be available in July. The examination has already been normed against more than 3,000 students in 41 colleges throughout the United States who took the examination as they were completing their elementary courses in computers and data processing. Consequently, given a score on the Subject Examination in Computers and Data Processing, it would be possible for a user of this examination to anticipate with reasonable accuracy the grade which an individual would make in an elementary course covering similar material.

The examination was developed for the College-Level Examination Program of the College Board by the Educational Testing Service, Princeton, N.J. The general specifications were designed by Prof. Gordon B. Davis of the University of Minnesota and served as the base for the examining committee, which was composed of Donald H. Sanders, Texas Christian University; James M. Adams Jr., Association for Computing Machinery; Miss Luta P. Eaves, Texas Technological College; Wayne P. Laurents, St. Petersburg Junior College; and Edward J. Laurie, San Jose State College.

This examination, as well as all other examinations in the College-Level Examination Program, will be given during the third week of each month at one of the CLEP centers located in larger urban areas throughout the United States. It may also be administered to groups of students institutionally and, if necessary, other special arrangements for the examination may be made.

The fee for taking the examination at one of the many CLEP centers is $15.00 and the institutional fee is $5.00.

Further information about CLEP, including the Subject Examination in Computers and Data Processing, may be obtained by writing to the College-Level Examination Program, College Entrance Examination Board, 475 Riverside Drive, New York, N.Y. 10027.

Professional Societies Simultaneously Announce Guidelines for EDP Schools

Two professional societies have published, almost simultaneously, guidelines for data processing schools.

The organizations are the Data Processing Management Association and the Association for Computing Machinery.

DPMA guidelines are much more detailed than ACM's, and although they seem, at first glance, to differ considerably, the concept of both are much the same.

The prime objective which ACM believes a data processing school should have is that of providing competency of sufficient depth, so that each graduate technician may be employed in an appropriate occupation in the data processing field.

DPMA lists their prime objective of schools as "to prepare students for entry level jobs, such as keypunch operator; punch card machine operator; computer operator; and computer programmer trainee."

The admissions policy on both are primarily the same – that prospective students should have the aptitude, motivation, and interest in the field before being admitted to the schools. They both believe students should be tested and interviewed to determine this factor.

Singled out in DPMA's suggestions on faculty qualifications is the Director of Education.

DPMA pointed out that the director of education must be actively involved in the educational function as opposed to administrative function. He should have a college degree or equivalent formal educational experience. He should establish records which support the student list, and should evaluate and individually discuss the performance of instructors on a scheduled basis.

ACM guidelines make no mention of this position.

The qualifications of faculty are about the same in both sets of guidelines. They mention that an instructor should be experienced in the field and have a college background of preferably four years – but two years is acceptable.

DPMA guidelines stress that a recent graduate of a school cannot be considered for the position of instructor until he meets the minimum work experience requirements, which are at least two years in the field.

Also highlighted by DPMA is that the instructional staff should consist of at least 75% permanent personnel.

Curriculum consists of thorough coverage of the courses.

ACM stated that they feel instructional materials should reflect current occupational knowledge and practice.

DPMA suggests that students should make use of "hands on time" as often as possible.

Both societies stated that when measuring a student's progress, the successful completion of assigned projects, adequate documentation and procedure manuals and periodic exams and instructor evaluation must be considered.

They felt that students should be tested by actual running of the computer and should be able to understand concepts and assess assimilation of absolute information.

Students should have adequate access to computer equipment according to ACM guidelines.

All programming course students who follow DPMA guidelines must write a minimum of four successful computer programs.

Students, Ages 7 to 17, Using Computers in School

Current experiments in computer-aided instruction allow the student to control the computer and use it as a tool. This is a radical departure in a field traditionally regarded in terms of drill-and-practice programmed instruction.

The following three articles discuss the experiments themselves, the educational advantages claimed, and the costs and feasibility of widespread application.

Written by Joseph Hanlon, these articles are based on an all-day session for educators at the Spring Joint Computer Conference entitled "Human Uses of Computers for Education," as well as on a shorter session, "Computer-Assisted Instruction: Current Status – Future Problems."

Second graders are programming computers and they love it. High school students are doing their homework on their school's computer.

Computer Aided Instruction now includes methods that differ radically from the traditional teaching machines and drill-and-practice programmed instruction. In these examples, children control the computer, and not the opposite.

But these are only pilot projects, and serious questions have been raised about their success, as well as about the feasibility of widespread implementation. Several pilot projects were described in detail during the Spring Joint Computer Conference at a special program for educators on the "Human Uses of Computers for Education."

```
←ALGE
12 * /BOX/ + 92 = 1112

WHAT IS /BOX/ ?
*10
IT TOOK YOU 29 SECONDS TO ANSWER ME YOU KNUCKELBRAIN THAT IS SLOW!
WRONG
THE REAL ANSWER IS 85
AN EASY WAY TO GET THE ANSWER IS TO SUBTRACT 92 FROM 1112 AND THEN
TRY TO DIVIDE 12 INTO 1020
```

Twelve-year-old Jim Cahill had already written a program called "ALGE" which posed simple algebra problems. The first line and the fourth line were typed by Jim, the rest were printed by the computer based on the program that Jim had already written.

In Project Logo, now underway in two Massachusetts schools, children as young as second-grade are taught a simple programming language and use computer terminals in their school. In Muzzey Junior High School in Lexington, Mass. seventh graders write their own programs to teach themselves algebra or logic, or to play simple games such as nim.

For simple algebra problems, the child writes a program which poses problems, such as $7x + 3 = 24$. The child gives the answer, and the computer compares it to the correct answer, telling him if he is right. The children also put in their own messages, such as "You're smart" for a correct answer, or "You Knucklebrain" for a wrong answer.

Considerable stress in Logo is placed on the distinction between a thing and its name, "the hardest conceptual obstacle for children to overcome," according to MIT Professor Seymour A. Papert. In Logo this is done by putting the object itself in quotes and the name of the object between slashes. Thus "Your Age" is Your Age, but /Your Age/ is 25.

A typical program which a child might write would be (lines beginning with a dash are input by child, others are printed by computer):

```
– CALL "DOG" "CAT"
– PRINT "DOG"
DOG
– PRINT "CAT"
CAT
– PRINT /CAT/
DOG
```

Students can also define procedures. In the following a loop to print out a word repeatedly is defined, then executed:

```
– TO WORK /M/
= 1 PRINT /M/
= 2 RETURN WORK /M/
= END
WORK DEFINED
– WORK "I LOVE YOU"
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
```

In Project Logo, the students work with the computer instead of a regular mathematics class.

Use Computer For Homework

Another Massachusetts project described was Local, now being tried in five high schools. In the project, students take regular courses and use the computer on their own time – free periods and after school – to do homework and special projects.

```
←GET AMY SUPERNIM
←P SUPERNIM
HOW MANY CHIPS DO YOU WANT IN THE GAME?
*7
DO YOU WANT TO GOFIRST?
*YES
7 CHIPS REMAIN
YOU MAY TAKE AWAY L1.2, OR 3
*1
6 CHIPS REMAIN
THE COMPUTER TAKES 1
5 CHIPS REMAIN
YOU MAY TAKE AWAY  1.2, OR 3
*2
3 CHIPS REMAIN
THE COMPUTER TAKES 2
YOU LOSE
DO YOU WANT TO PLAY AGAIN?
*NO
BYE
```

Program written by 12-year-old Amy Wolfe to play the game of nim. Amy called her program "AMY SUPERNIM" and had it already stored. Lines with a - or * on the left were typed by Amy, others were typed by the computer, based on Amy's program.

Stanford University's Patrick Suppes described several projects in which the child does not program the computer and does not have control over it, but where the child still has considerably more flexibility than with traditional programmed instruction.

One project is a course in logic for bright students in grades five through eight. The student sits at a computer terminal, and is given the premises and the statement he must prove. The computer checks each step as he writes it, telling the student if it is logically correct. But the computer has no particular correct proof stored, so any proof will be accepted so long as each step is correct.

Another of Suppes' programs helps third grade children learn to do word problems in arithmetic. Suppes notes that children always have trouble putting word problems into computational form, and that arithmetic errors only complicate matters.

Suppes has the computer aid in formatting, and the students then use the computer as an adding machine. In a typical situtation, the computer poses a problem such as "John goes to the store and buys 6 eggs at 9 cents each and 5 pounds of potatoes at 7 cents per pound. How much did John spend?" Then the computer prints out all of the relevant numbers:

1) 6
2) 9
3) 5
4) 7

The student tells the computers what operations to perform, and the computer does the actual calculation. To find the

(Continued on Page 17)

```
←TO WORK /M/
•1 PRINT /M/
>2 RT WORK /M/
>END
WORK DEFINED
←P WORK "I LOVE YOU"
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
I LOVE YOU
```

Simple computer program, called "WORK," written by 12-year-old Amy Wolfe as part of Project Logo. In the first four lines Amy writes a simple loop program that prints the phrase infinitely. In the sixth line, Amy calls for the program to print "I LOVE YOU," which the computer does in the following lines.

```
←P ALGA

8 * /BOX/ + 7 = 39
WHAT IS /BOX/?
*2
YOU'RE WRONG 8 * 2 + 7 = 23
WHAT IS /BOX/?
*4
YOU'RE SMART
```

Logo allows considerable individualization. Compare this algebra program written by Amy Wolfe to the one written by Jim Cahill.

Sixteen high schools in Minnesota, Iowa, and Wisconsin were represented at a two-day computer workshop on the campus of College of St. Teresa, Winona, Minn.

$25 or $400 per Year?

Student EDP Costs Vary Widely

"There has been a plethora of suecessful experiments, but very few break out of their hot-house environment. There is a woefully deficient apparatus for taking successful experiments to application in a large number of schools. The institutional structure of schools is almost ideally designed to resist change."

Anthony G. Oettinger is a Harvard professor, past president of the Association for Computing Machinery, and author of *Run, Computer, Run.* His statements, including the preceding one, brought strong reaction from other members of the panel. But they conceded that as much as a decade of research and development was necessary to bring current experiments into widespread application. And it is not clear where the money will come from.

"The education industry does not seem prepared to make a committment on research and development," Oettinger said. Singling out publishers in particular, he said, "They must be more than just a pipeline for manuscripts." But he was not hopeful about textbook publishers, concluding that "a more venial, profit-mongering group is hard to find."

Costs High

Research and development is not the only area of disagreement among the experts. Cost is another. Costs are currently much too high for most school systems, but several panelists claimed that present cost is irrelevant. "It's like asking the cost of a TV set in 1939," declared Seymour A. Papert.

What are the current costs? Project Local, in which students use the computer only in their free time, estimates that it costs $25 per student per year to offer students all of the computer time they can use. This can be compared to the less than $5 per student per year that most schools spend on all textbooks.

Project Local has a PDP-8/L with four on-line and three off-line terminals in each school. Allowing students unlimited use of the computer, they found that students averaged 30 minutes per week of terminal time. Based on a 40 hour week with 75% utilization, Project Local director Robert Haven estimated that one computer could serve 350 students and would cost $8580 per year, or approximately $25 per student per year.

Haven's estimate is based on the assumption that the computer is purchased and amortized over five years. His estimated budget, based on one year of experience, is:

computer cost	$4230
maintenance	3900
supplies	150
space	300
	$8580

Of the $25 per student per year, half is purchase price, so if the capital cost can be sneaked into a building program, for example, the apparent cost drops to $12 per student per year.

Using the computer for night school or during the summer could cut the $25 per student cost to $18, according to Haven.

Haven stressed that these are add-on costs, since no teachers are being replaced. He also noted that two factors would raise initial costs: special teacher training and establishing a resource library. But he said that no special textbooks were needed by the students, despite the fact that several have been published.

Stanford professor Patrick Suppes gave cost figures of $400 per student per year for two programs he is working on: one for teaching programming to high school students, and the other for teaching Russian without a teacher. His project with elementary school mathematics instruction costs about $50 per year per student, he estimated.

Is Cost Relevant?

But is it relevant even to consider cost at this time? MIT professor Seymour A. Papert declared that considering costs now is like asking the price of a TV set in 1939, and that mass production would force prices down sharply. But Oettinger said that school systems are not like individual buyers of TV sets, and declared emphatically, "It won't happen in this market."

Other panelists disagreed. Papert noted that Oettinger's book included a table with 1967 costs for time-shared terminals provided by seven different companies. Papert said that he checked recently with the same companies, and that prices were down to almost one-third those given in the book.

But it may not be relevant to consider costs at all. Duncan N. Hansen of the University of Florida said, "I'm afraid that things will be so inexpensive that we will have gadgets all around and not know what to do with them." And Papert claimed, "The schools are going to install computers no matter what the cost. The question is how we are going to make the best use of them."

Who Should Decide?

Who should decide how to use the computers, the computer people or the schoolmen? Each pointed at the other. Oettinger charged that the educators must decide why they want the computers. But Gordon Peterkin, superintendent of schools in Westport, Conn., said, "We are new in this area, and that makes it hard for us to say what we want from computers." But Haven said that leaving things up to the computer people is like saying, "You are an expert on pencils. What should we do with pencils?"

So priorities and goals are fuzzy, but experiments continue. Bringing these experiments to widespread implementation will require a decade of research and development, however, and it is not clear that the required research and development will be done.

Students Use Computers For Homework Assignments

(Continued from Page 16)

price of eggs, one multiplies 6 times 9, or line 1) times line 2). In this project, the child types "1,2 M". The solution to the problem is:

```
1,2 M 5)  54
3,4 M 6)  35
5,6 A 7)  89
  7,X
```

The child types only what is in the left column, the computer does the rest. The "7,X" indicates that the child believes that line 7) is the correct answer. The computer will tell the child whether this is correct or not, but will not comment on the method of arriving at the answer. Again, the child is allowed to find his own way to the answer, and not forced to use one method as prescribed by a teacher or the machine.

In all of these experimental projects the child uses the computer as a tool. He is not forced down a rigid path to suit the limitations of a machine.

Pupils Are Clamoring To Program Computers

"Kids love to program computers," declared Wallace Feurzeig, director of Project Logo.

"A computer terminal has tremendous motivating power," said Robert Haven, director of Project Local. "Rather than having a problem in getting the students to work with the computer, the problem is just the opposite – keeping students from overdoing it."

But Haven also noted that "no one has explained this adequately." The difficulty is that none of these experimental projects has been around long enough to get any real answers; it may be that the children are just fascinated with a shiny new toy, and familiarity may breed boredom.

So far, however, computers do seem to have an important motivating effect. A teacher at a school participating in Project Logo got up from the audience during the question period to say, "The excitement in my school is fantastic. The students are clamoring to use the terminals; they even come after school."

Teaching the Computer

Having the child in control of the computer has two important educational advantages, according to the panelists.

First, the student writes a pro-

(Continued on Page 18)

Do Students Benefit Using Computers?

(Continued from Page 17)

gram for a problem solution, which means that he must "teach" the computer how to solve the problem. Haven noted: "The student gains all of the benefits of having 'taught' someone how to use the principle being studied and also obtains rapid feedback concerning the accuracy of his 'teaching,' *i.e.*, his program either runs or does not."

Second, the programming language gives the student a language to talk about the problem and to talk about his errors.

Do Students Learn More?

Several panel members cited impressive educational gains for children using computers. Project Logo director Feurzeig said that second graders showed a "striking improvement" in reading after three months with the computer.

Haven cited a class in high school algebra that was broken into three groups, all with the same teacher and same instruction. Students in the control group did their homework by the usual pencil and paper method. The second group was taught flowcharting, and used this to do their homework. The third group was taught flowcharting and programming, and did their homework on the computer.

Before and after the course, the groups were tested in general scholastic ability and in abstract reasoning. The computer group improved more than twice as much as the control on the general scholastic aptitude test and almost four times as much on the reasoning test (See Chart).

% increase in group mean

Comparative results achieved in improving abstract reasoning and scholastic ability as indicated by comparative tests.

	abstract reasoning	scholastic ability
control	4.6	2.9
flowchart	9.7	5.1
computer	17.2	7.5

But how significant are these results? One questioner wondered whether improvement in grades didn't simply reflect the increased individual instruction in the experiment.

Instruction Individualized

An important claim made for this sort of computer-aided instruction is that it is individualized; the student learns at his own pace and by his own route. MIT professor Seymour A. Papert charged that, "With a class of 30, a teacher must prevent diversity," but that computers represent a way out of this "educational morass." In the experiments, children do not have to solve a problem in exactly the same way as the teacher, and may even work on totally different problems.

But can the individualization of the experiments be maintained in a normal school environment? Harvard Professor Anthony G. Oettinger says "no." In his book *Run, Computer, Run – The Mythology of Educational Innovation,"* he points out that language labs were "the most glistening mark of educational technology" and promised individualization in language instruction. But in practice, this has not happened, he claims, citing as an example the language laboratory procedures in the Watertown, Mass., high school which include the statement: "No one is an individual in this laboratory."

Books promise the ultimate in individualization, notes Oettinger, but even there, "school libraries are scarce, cramped, and inaccessible to their intended users, the children," and most school librarians seem happiest when the books are all neatly in their places on the shelves.

Printout Provides Record

Another advantage cited for this form of computer-aided instruction is that the printout provides a record of everything that the child did, so that the teacher can study it and find out exactly where the student is having problems.

Finally, the panelists cited several psychological advantages for using computers in education. Papert said that by learning the concepts of bug and debugging, the children learn "a more constructive approach toward problem solving." He explained that when there is a mistake, rather than feel that he was stupid to make it, the child thinks in terms of correcting the error in order to make the program run or the answer correct.

Sex by Computer?

Duncan N. Hansen of Florida State University noted that peer groups frequently provide a "social deterrent" to learning, and that the interaction with a computer can be "far less punishing" than interaction with peers in some cases. He cited sex education as one area in which this might be a problem that a computer could solve.

Computer May Have Caused School Racial Trouble

By Joseph Hanlon
CW Staff Writer

Racial trouble at a high school may have resulted, in part, from the school administration's jump to computer-generated schedules without first considering their effect on the students.

In 1967, the school decided to switch to modular scheduling for the 1967-68 school year. A modular schedule is a highly flexible one consisting of short periods (16 minutes in this case), team teaching, and large and small groups. It is too complicated to be established without the aid of a computer.

Modular scheduling places stress on independent study. Class time is cut by one quarter and the student's free time is sharply increased.

The computer output for the high school's first modular schedule did not provide a useful list of students who would not be scheduled to attend class during particular periods, so no attempt was made to organize required study halls. The result was chaos.

Students were completely free when they were not scheduled to be in class. As a result, the highly motivated students spent their free time in resource centers or libraries, while the others wandered around the halls or sat in the lunch room. The luncheonette next to the school increased its gross by $100 a day over the previous year.

In theory, teachers will use some of their newly acquired free time to work with unmotivated students. In practice, this failed to happen. An assistant principal said, "Our year of modular scheduling wiped out the C student. He either went up to an A or B, or dropped to a D or F.

"We lost complete control of both students and faculty," he admitted. Class cutting jumped, and the failure rate skyrocketed. He added: "In our school, the whites tend to be more motivated than the blacks, so that the resource centers became almost all white." Some black students and parents became convinced that modular scheduling was just a device to fail black students.

"Since a lot of kids spent more time in the lunch room, they tended to congregate with their own group. The blacks sat on one side and the whites on the other," the assistant principal said. "Our year of modular scheduling segregated the school; it set back integration ten years," he added.

The first racial incidents came in the fall of 1967 in the newly segregated cafeteria. These involved just food throwing and were not considered serious. But that exacerbated the racial split.

Racial troubles in the fall of 1968 were serious enough to close the school for several days. "Black pride and white backlash contributed," said the editor of the student newspaper. "But the extra free time was also an important factor in both the segregation and the disturbances."

(Editors note: In exchange for their cooperation on this article, CW agreed not to identify the high school.)

Condensed Course In EDP Offered

COLORADO SPRINGS, Colo. – A highly condensed course to orient new people to the systems-analysis area of EDP is being offered by Systemation, Inc. here.

The course is designed to provide an intense exposure to the fundamentals of systems analysis and experience with solution of real problems.

Visual aids and proven teaching techniques will be employed throughout the workshop sessions. Workshop projects are to be completed by attendees under the tutelage of trained personnel who are experts in systems analysis, according to the company.

The course consists of two parts. The first is a correspondence course which contains reading and written assignments. The second part is the workshop, which is intended to provide practical experience in using the tools studied.

British Computer Society Develops Qualification Exam

The similarity between the ACM and DPMA approaches to the problem of educating programmers for the industry should not obscure the fact that there are other alternatives.

One of the most developed programs that exists is run by the British Computer Society. Here they reorganized the society, and then set up a series of examinations, relying on the society to do the work rather than passing on the responsibility to various schools.

The examinations provide the applicant with two compulsory papers plus a number of optional ones. This is not as bad as it may sound because in the compulsory papers he is allowed to choose six questions out of ten, so he has a fair amount of leeway. The two are both general, and normally have essay type answers, as in question 3 in general paper II shown below.

This questions asks, "What benefits are available to the programmer who uses a problem oriented language?" The society expects an intelligent discussion of the problem, not a specific set of answers. These exams have the interesting result that they must be graded by hand rather than by a computer. There are no multiple choice type questions.

Perhaps the British Computer Society thinks that it knows enough about computers not to be prepared to entrust the marking of programmers' examinations to their inflexible methods!

The following are specimen papers for the Society's Professional Qualification Examination:

GENERAL PAPER I

Not more than SIX questions to be attempted. Time: 3 hours.

1)
a) Given a fixed word length of 24 bits, describe an efficient method of storing alphanumer characters? What kind of facilities are desirable for manipulating and processing such data?

Exam No. 304

The following are specimen papers for the Society's Professional Qualification Examination:

GENERAL PAPER I

Not more than SIX questions to be attempted. Time: 3 hours.

1)
a) Given a fixed word length of 24 bits, describe an efficient method of storing alphanumer characters? What kind of facilities are desirable for manipulating and processing such data?

b) It is required to store the following quantities in a single 24-bit word

a decimal integer x $-100 \leqslant x \leqslant +100$;
a decimal integer y $0 \leqslant y \leqslant 1023$;
a 6-bit alphanumeric character.

Show how the bits of the word can be allocated and describe a procedure to unpack the three quantities and place them in three separate store locations. State carefully what logical and/or shift operations have been used and what assumptions you have made regarding the representation of negative numbers.

2)
a) Compare the merits of punched paper tape and punched cards as input media for a data processing system.

b) Describe the facilities available for preparation of input data to a computer using one of the following

i) punched cards;
ii) punched paper tape;
iii) some other input medium.

3)
a) Describe efficient procedures, to convert
i) a positive decimal integer to binary form;
ii) a positive octal fraction to decimal form.

b) Find the binary equivalent of the decimal fraction 3/7, correct to 9 binary digits after the point. Hence find the octal representation of the decimal fraction 6/7 with three octal digits after the point and comment on the accuracy of representation.

4)
What is meant by a normalised floating point number? Give the range of normalised floating point numbers which can be represented using a sign and eight hexadecimal digits, including an unsigned two-digit characteristic.

Discuss the advantages and disadvantages of using floating point arithmetic.

5)
a) Describe, with the aid of a diagram, the basic structure of a simple com puter. Outline the flow of information when executing the following instructions which are in two-address form

i) 'Add store to store';
ii) 'Jump if store positive'.

b) What considerations influence the choice of word length in a fixed word length binary computer?

6)
A motorist selecting a vehicle considers the following factors

purchase price;
economical fuel consumption;
high speed capability.

He specifies that the car he will purchase must satisfy *at least one* of the following criteria

a) cheap and slow;
b) low fuel consumption and cheap;
c) fast and expensive;
d) low fuel consumption but slow;
e) fast but high fuel consumption.

Prepare a Truth Table, a Venn diagram and a Boolean expression to represent his requirements. Restate his requirements in a simpler form.

7)
Outline the development of computer applications in the past twenty years with particular reference to ONE sphere of industry, science or commerce.

8)
a) What factors affect the time taken to access a block of information held on a magnetic *disc?*

b) A magnetic *tape* system has the following characteristics

length of recordable tape	2,000 feet/reel
packing density	200 characters/inch
normal tape speed	100 inches/second
interblock gap	0-75 inch
start time	0-006 second
stop time	0-004 second
block length	1,000 characters.

Calculate

i) The total number of characters on one tape reel.

ii) The time to traverse from the beginning to the end of the tape (assume that the tape stops at each block gap and ignore processing time).

9)
Four binary signals, A, B, C, D, are available.

The three signals, A, B, C, represent an octal digit.

The signal D is a control signal.

An output signal X is required when signal D is 1 and ABC represent 2, 3, 6 or 7, and when signal D is 0 and ABC represents 2 or 3.

Sketch a logic diagram using AND, and NOT elements to produce the signal X.

10)
Discuss the role played by analogue computers in the simulation of industrial processes

GENERAL PAPER II

Not more than SIX questions to be attempted. Time: 3 hours.

1)
With reference to an appropriate simple example of your choice, illustrate the main steps in the analysis of a problem for computer solution and discuss the construction and use of flow charts.

2)
Explain carefully *three* of the following programming concepts

a) the stored program;
b) transfer of control;
c) open and closed subroutines;
d) modifier registers (index registers) and counters;
e) absolute and relative addressing

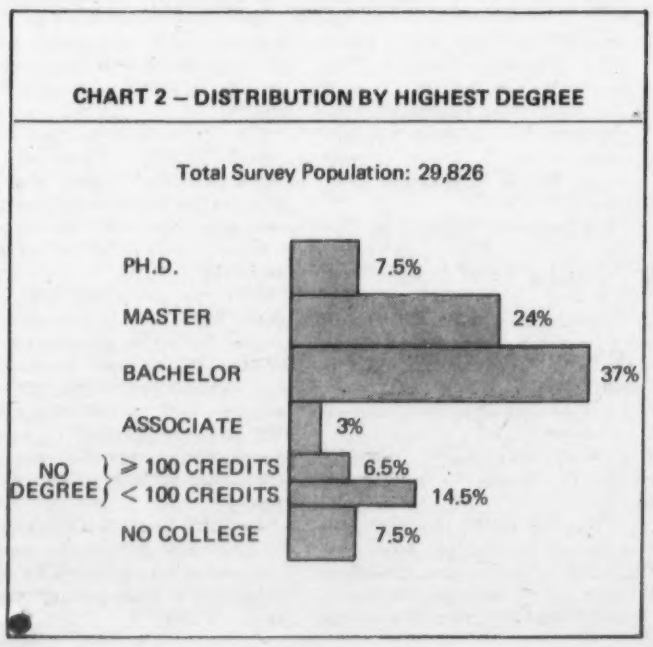
3)
What benefits are available to the programmer who uses a problem-oriented language? What further benefits should the programmer obtain from diagnostic facilities associated with the compiler for the language? Why are the benefits not usually available to a user who programs in machine language.

4)
Discuss the extent to which the listing of a program is adequate documentation of that program. What additional documentation might be required by the originator

(Continued on Page 20)

Chart Shows Degree Distribution

Societies Run Survey on EDP People



Principal societies in information processing received contract support from the Department of Defense Advance Research Projects Agency to conduct a survey about information processing personnel, and to process and publish the results.

One objective of the survey was to obtain data characterizing the professional make-up of members of the participating societies. Such data, they felt, should be descriptive of professional categories, activities, and other factors of employment in the field of information processing.

The other objective was to make the results of the survey available to the membership and the general public through the media of the participating societies.

The chart shows the distribution by level of highest degree of respondents surveyed.

Error Bounds Are Featured in British Computer Society Exam

(Continued from Page 19)

of the program (who may wish subsequently to extend the program) and by a library in which the program is lodged?

5)
What is understood by an iterative process in numerical computation? Why are such processes particularly well suited for use in computer programming?

Derive an iterative process for extracting cube roots and draw up a flow diagram which could form the basis of a computer program. Comment upon the choice of initial approximation to the root, the theoretical convergence of your method, the proposed criterion for detecting convergence within the computer, and the provision of error exits from the program.

6)
A square matrix is said to be upper triangular if all its non-zero elements lie on or above the principal diagonal. Write out in full the equations represented by $\underline{A}\,\underline{x} = \underline{b}$ where A is upper triangular of order $\underline{n}$, $\underline{b}$ is a constant vector and x is unknown. Show that these equations may readily be solved provided that the diagonal elements of $\underline{A}$ are non-zero, and draw a flow diagram for this process.

7)
a) If 10 per cent of the bolts produced by a certain machine are defective, find the probability that, out of four bolts chosen at random, at most one bolt will be defective

b) What is understood by 'time series'? Show, by means of diagrams or otherwise, what is meant by 'long-term trend', 'cyclical movement' and 'seasonal movement'. Describe briefly the method of moving averages for the estimation of trend.

8)
What is understood by 'mathematical model'? Illustrate your answer by formulating mathematically the following problems

a) N customers each order specified amounts by weight of each of *M* products. The cost of delivering unit weight of a given product to a given customer is known. What is the total cost of supplying all the orders received?

b) A certain firm manufactures two types of cloth and uses three different colours of wool. It has available specified total amounts of each of the wools and the amount of each of the wools required in order to produce unit length of each of the cloths is known. The profit made per unit length of each of the cloths is also known. How many units of length of each of the cloths should be made in order to maximise the profit?

Indicate briefly how you would solve problem b).

9)
A company is intending to use its computer to keep records of each of its large number of employees. Among other things, the following information is required in respect of each employee: full name; address; date of birth; sex; marital status; the department of the company in which the employee works; type of employment; current basic wage or salary.

Discuss briefly the way in which you would create a record in respect of each employee assuming that the computer has a punched card input and a large magnetic tape backing store. Indicate how to produce a distribution, by year of birth, of male employees of the company.

10)
Fixed point arithmetic is being performed in eight-bit registers with two binary digits after the point. For the following expressions assume the numbers are binary and give the results which would appear in a register after the specified operation

a) 1011·11 + 10·01
b) 101·10 x 101·10
c) 101·10 x 1·01
d) 101·11 ÷ 1·10

Calculate the absolute and relative error involved in the representation of each result. Give the bounds on the absolute and relative error produced by truncation when using these registers in this way.

OPTION B: PROGRAMMING

Answer ONE question from Section A and THREE questions from Section B.

The answer to the Section A question will carry 50 per cent of the marks for the paper. Time: 3 hours

Section A

1)
The flowchart at right describes a method of solution for the quadratic equation

$$ax^2 + bx + c = 0$$

where a,b and c may have errors $\pm\alpha, \pm\beta$ and $\pm\gamma$ respectively, ϵ defines the accuracy that should be worked to. The results are the pairs of real (X1, X2) or complex (Y1, Y2) roots produced by considering all combinations of the errors.

a) Using a generally recognised high level language, write a program for this process.

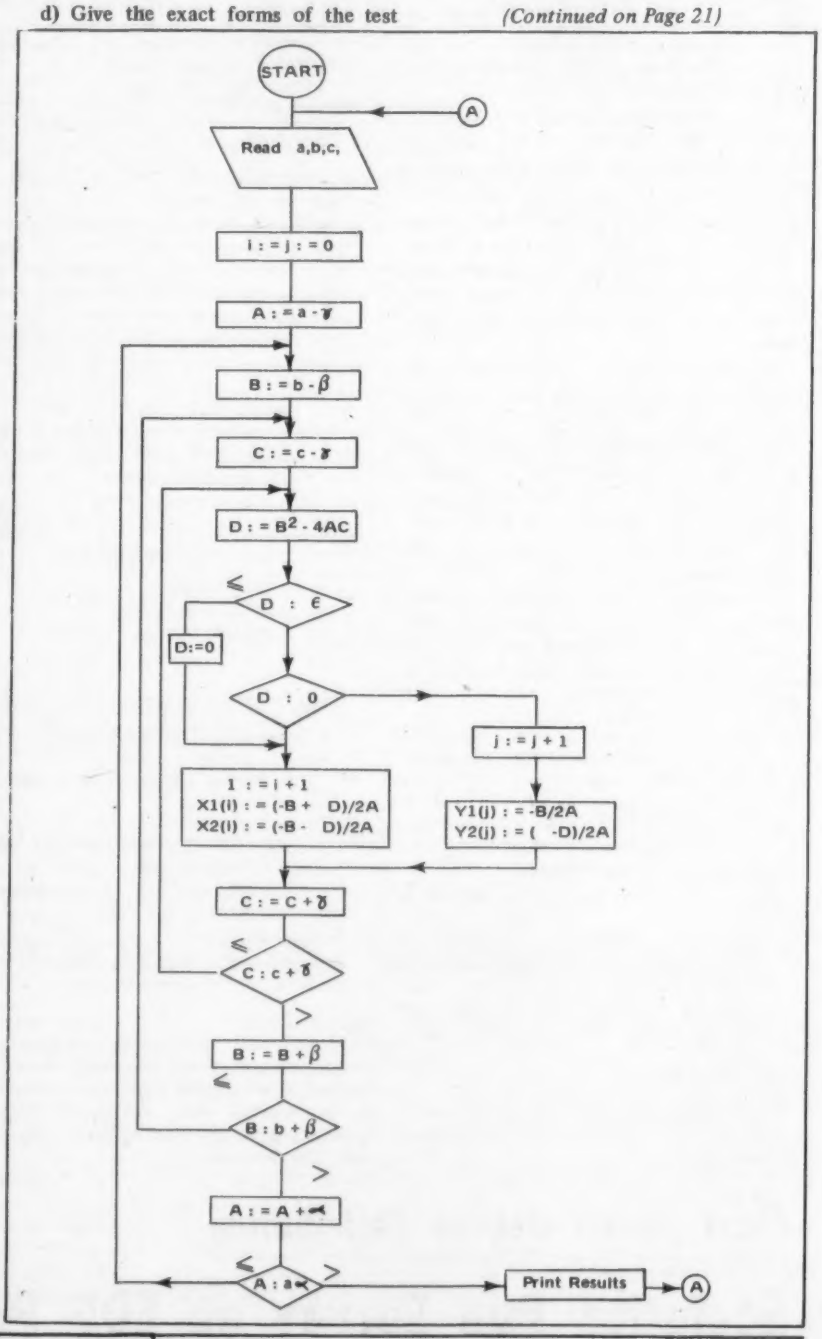
b) Give precise details of your input and output layout.

c) Describe carefully what diagnostic aids you would use to test the program.

d) Give the exact forms of the test data you would use and the expected results together with reasons for using each set of test data.

e) The results given by this program are not really satisfactory. Give a flowchart for a process which will take the present results as input and produce as output the range of each root.

(Continued on Page 21)



Modules Computer Course Offered

JACKSONVILLE, Fla. – Computer Languages Corp. now offers computer courses in modules, permitting students to begin instruction at more frequent intervals at a newly opened branch school in Miami at 2138 Biscayne Blvd.

According to Richard A. Calhoun, president of the Jacksonville-based Computer Instruction Center, this approach will also permit refresher courses in particular modules without the necessity of enrolling in the entire course.

Actual operation of a variety of makes and sizes of computers, utilizing "hands-on" instruction, will be taught in the Miami school.

The school will offer courses in disk and tape computer systems, as well as courses in a number of different computer languages. Instruction in the repair and maintenance of equipment will not be required (frequently the case in manufacturer-operated schools).

"Instructor standards for Computer Languages Corp. require a four-year college degree plus a minimum of three years of data processing experience for all instructors and directors," Calhoun said.

The computer-instruction school will also schedule special courses for businesses interested in familiarizing their personnel with computer systems. Short courses aimed at understanding and communication between management and programmer will also be offered, according to Calhoun.

Computer Languages Corp. is a wholly owned subsidiary of Computer Controls Corp., a Miami-based time-sharing company.

British Exams Give Applicants Choice of Questions

(Continued from Page 20)

2)
The first phase of a stock control suit is a program which reads stock cards (which have been previously sorted into stock number order) and creates a master file of master records on magnetic tape (or disc).

The stock cards contain: stock number – identification; code -0 for new stock, 3 for deletion; description of line – for listing purposes; reorder level; maximum stock level.

The master file record contains: stock number; number in stock; description of line; reorder level; maximum stock level.

Design the card and record layout and write, in a generally recognised high level language, a program for the procedure described in the flowchart below.

Section B

3)
Using the twos-complement form of number representation, explain how 'floating-point' differs from 'fixed-point' and indicate the advantages and disadvantages of employing the former method. Explain what is meant by 'normalised' in the context of floating point arithmetic when the mantissa is stored in

a) hexadecimal groups,
b) octal groups,
c) binary.

4)
On a computer with multi-programming facilities, programs with low CPU and high peripheral usage should be run in the top priority level.

Explain this statement and comment on its validity. What is meant by a computer being 'peripheral-bound'?

5)
If you were given the task of writing a main-store dump routine what features would you incorporate (assuming there are no hardware restrictions on your suggestions)? In what circumstances would you expect it to be used?

6)
Describe the principal features of a general operating system for a machine configuration which includes at least one type of packing store, e.g. a drum, magnetic discs or magnetic tapes, a line printer, at least one basic input device, e.g. card reader or paper tape reader, and a console typewriter.

Within the framework of this operating system describe the system commands you would use to enable you to compile and execute a program which is modular in structure and which is written in either a scientific or business oriented language.

7)
Give a detailed flowchard describing

EITHER an internal 'shuttle' sort
OR a polyphase tape sort.

Describe in words (and with diagrams if required), using a suitable list of numbers, how the sort process works.

8)
Write an essay on one of the following

a) time sharing;
b) multi-programming;
c) multi-access;
d) list processing;
e) on-line interactive systems.

OPTION C: DATA PROCESSING

Answer FOUR questions from Section A and ONE question relevant to your specialist subject from Section B. Time: 3 hours.

Section A

1)
Discuss the problems connected with the use of variable length records on magnetic tapes and discs. In what circumstances might you choose to use variable length records?

2)
Explain the concept of an 'addressing algorithm' in connection with direct access storage devices, giving one particular example by way of an illustration. Explain what is meant by a 'bucket' and discuss the 'overflow ploblem'.

3)
Describe a basic process of forming ordered strings and merging them. Show how these processes are employed in any particular magnetic tape 'sort package' with which you are familiar.

4)
List some principal forms and charts used in systems documentation. Give a detailed description of any two.

5)
Describe the functions of the following items of punched card equipment

a) sorter;
b) collator;
c) tabulator;
d) calculator;
e) summary punch.

6)
Compare the facilities offered by the TELEX, DATEL 200 and DATEL 600 services. Describe the equipment usually associated with the use of on-line data transmission.

7)
Write short notes on any THREE of the following

a) decision tables
b) picture clauses and report editing
c) magnetic tape file security
d) magnetic card ledger accounting machines
e) OCR readers and fonts.

Section B

8)
Describe in outline a commercial computer application known to you. You should include a systems flowchart showing the organisation of the job in computer runs, describing each run with brief details of the input, output and files used. You should also list the criteria used in justifying the implementation of the system on a computer.

9)
Set down the factors which you would need to investigate and evaluate in deciding on a computer configuration for an organisation.

10)
Describe KWIC indexing and citation indexing. Discuss their comparative merits.

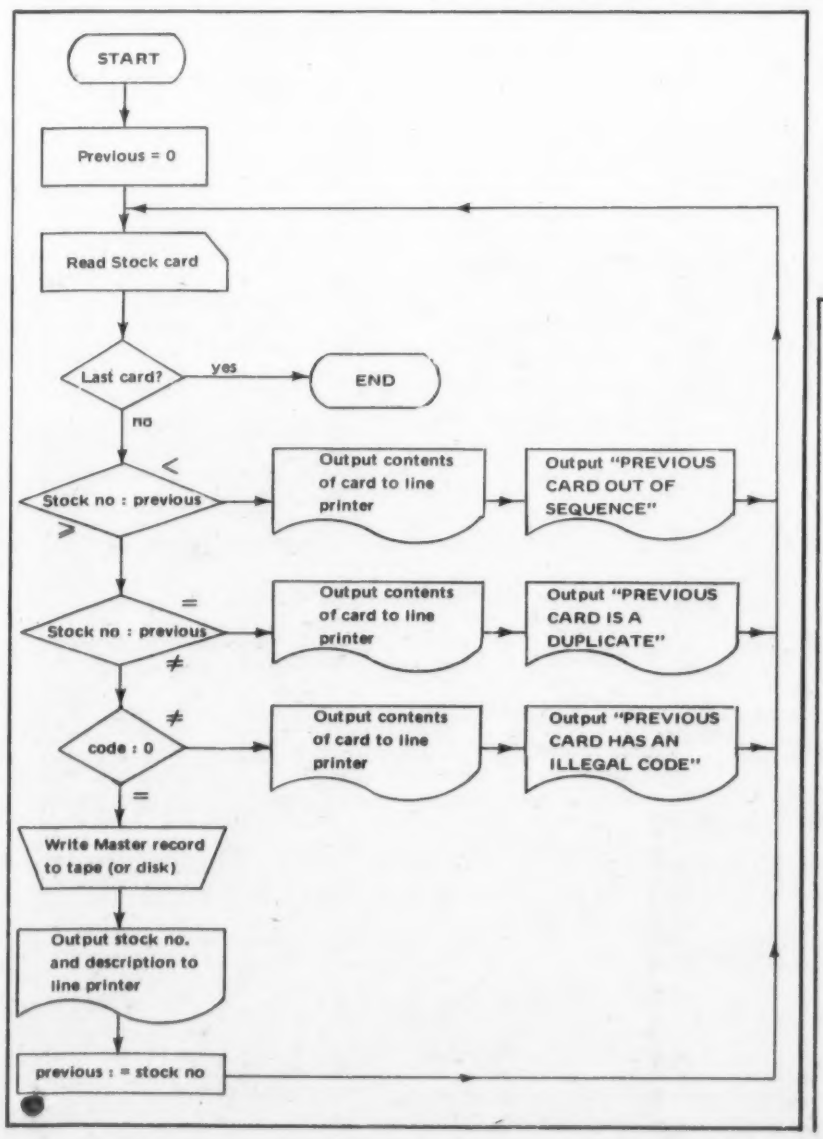
11)
If you were asked to set up an information retrieval service within an organisation, describe how you would set about ascertaining the information requirements of the organisation and discuss the criteria which would influence your choice of abstracting, indexing and classifying methods.

12)
Describe in outline the features of a large-scale computable model known to you in the field of *either* engineering *or* business *or* economics. Use the model you have described to elucidate the general philosophy of modelling.

13)
In what circumstances does an interactive programming system appear particularly attractive to the user and why? Illustrate your answer by reference to a system with which you are familiar.

14)
Describe the facilities of a general survey analysis program with which you are familiar and describe an application of it.

15)
Discuss *either* textual analysis by computer *or* the use of the computer in urban planning.



COMPUTERWORLD

Societies

1,748 DPMA Exams Given This Year

SPRINGFIELD, Ill. – The Data Processing Management Association's examination in data processing was administered to 1,748 candidates at 94 examination centers this year.

Of that number, 962 people earned the Certificate in Data Processing and are privileged to use the designation CDP after their names.

Since its inception in 1962, the Certificate in Data Processing examination has been administered to 17,097 candidates, 10,351 of whom have received certificates from DPMA.

The exam tests a broad area of data processing knowledge considered mandatory for competence in the profession, according to the association.

Certification is granted to candidates who pass the examination, meet a three-year experience requirement in data processing, and fulfill the academic requirements.

1969 FJCC Special Committee Seeking Computer Art Entries

FULLERTON, Calif. – The Special Activities Committee of the 1969 Fall Joint Computer Conference is seeking computer art entries for display during the conference.

The exhibit will be held without charge in the International Hotel across from the Las Vegas Convention Center near "The Strip" from Nov. 16 through the 20th.

The contest includes two categories – art about computing and art prepared by computing. Prizes will be awarded.

Art should be used to reflect and interpret computing and computers, the science and the art, industry and society, or people and machines.

Entries making social commentary should reflect the significance of computing as a factor in our times and technology.

Entries depicting the present and the next decade (in keeping with the conference theme, "Threshold of the Seventies") are desired.

Judging will be by a panel whose members will be announced Aug. 1. Entries will be accepted from Sept. 2 through Sept. 22. Details are available from the Special Activities Committee, '69 FJCC, 1209 N. Riedel Ave., Fullerton, Calif. 92631.

ACM Holding Workshop for Blind

CLEVELAND – The Association for Computing Machinery Committee on Professional Activities of the Blind will hold a three-day workshop and meeting involving blind programmers, their employers, and members of rehabilitation agencies and support groups.

The conference will take place here Oct. 9-11.

There will be a discussion of the training, placement, and problems encountered by the blind programmer in functioning as a productive person.

The committee believes that it is of great importance that all blind programmers and their employers attend the conference to talk about the successes and failures of programmers and employers.

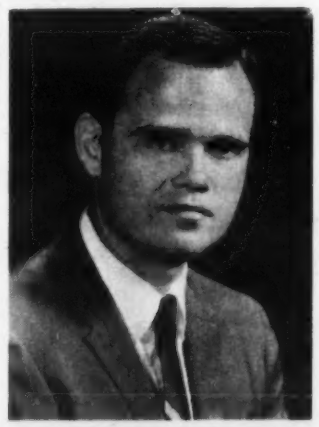
The conference is open to all.

Further information may be obtained from A.F. Collard, Conference Chairman, Eastern Airlines, Inc., Miami International Airport, Miami, Fla. 33148.

Edward Becker Elected to Post In DPMA Chapter

CHICAGO – Edward C. Becker Jr. of Olympia Fields, Ill., was elected to the office of executive vice-president of the Chicago chapter of the Data Processing Management Association. He has been an active member for 10 years.

Becker is National Director of Sales and Marketing for the Stat Tab Division of Statistical Tabulating Corp.



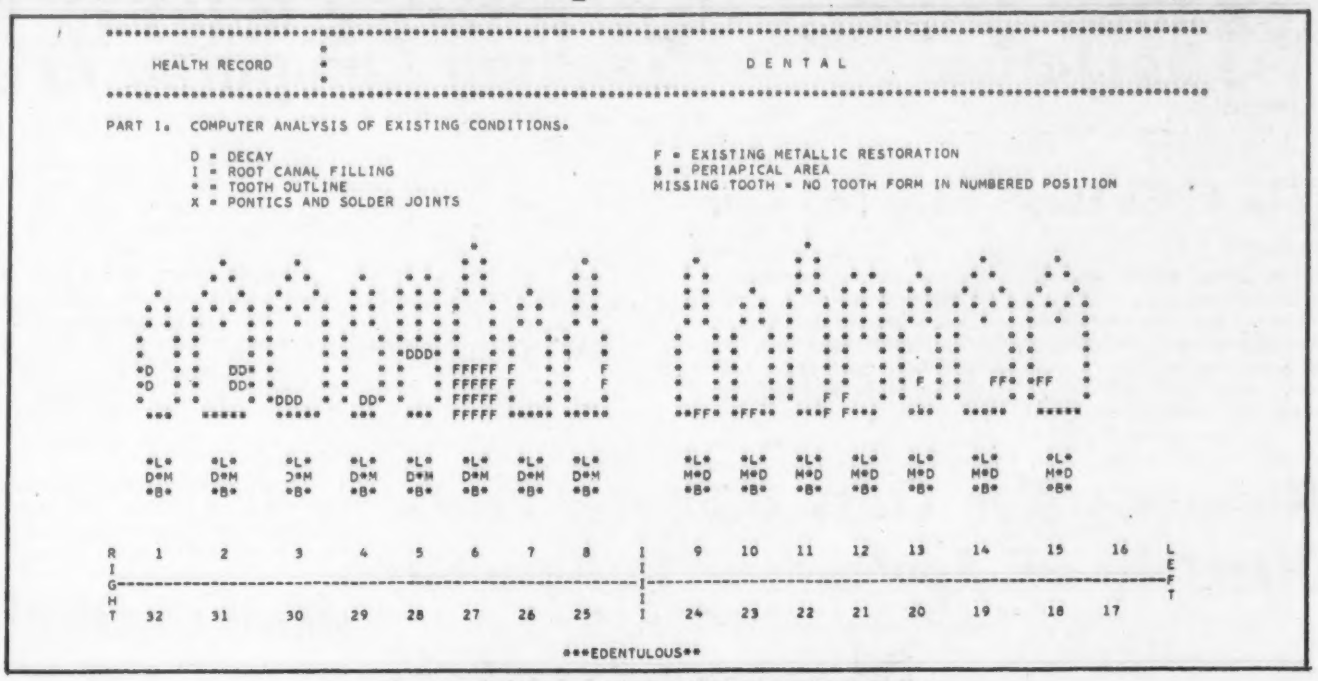
Computer/Scanner Aids Analysis of Dental X-Rays

WASHINGTON, D.C. – A meeting, some 15 months ago between Major Gen. Robert B. Shira, assistant surgeon general and chief of the U.S. Army Dental Corps. and Dr. David Mushabac, research scientist at the New York State University at Stony Brook, has resulted in an improved dental diagnostic and recording system. Specifically, the Armed Forces were interested in reducing the time it takes to examine and diagnose each recruit and patient.

Col. Donald J. Styer, in Gen. Shira's office, and Dr. Mushabac discussed the possibility of developing a dental x-ray computer/scanner unit that would free Army dentists for more productive duties and patient care; speed the interpretation and accurate recording of the Panorex x-ray; and develop a more economical, yet faster method of handling volume dental requirements in reception centers.

Last month Dr. Mushabac successfully demonstrated to senior dental officers at Walter Reed Army Institute of Research the feasibility of his dental x-ray scanner with immediate computer readout. The unit demonstrated that the time needed for the average patients' diagnostic examination was reduced to about one minute. The time lag between the x-ray of a patients' mouth and the resulting study and diagnosis has also been completely eliminated; and since the scanner automatically reads and the computer automatically records the condition of the patients' mouth, substantial savings in time and record keeping are assured.

The U.S. Army Medical Research and Development Command, commanded by Major Gen. Joe M. Blumberg, sponsored the development of the Scan-1.



A printout of the computer's analysis of a patient's teeth.

System to Speed Firm's Linen Deliveries

KANSAS CITY, Mo. – Standard Linen, Inc., one of the Kansas City area's largest distributors of linen products to restaurants and industry, will soon be managing its complex daily inventory problems by computer.

One of the major applications for the NCR Century 100, to be delivered in November, will be the automatic preparation of daily inventory lists for each route man. These detail the volume of used linen to be picked up at each of many locations. The tight control system is expected to reduce item losses which in this type of large-volume rental business can run extremely high, a Standard spokesman said.

The computer will also provide reports which will help management govern plant load and schedule routes and other operations. The system also will handle invoicing and prepare payroll.

Standard Linen, which has been expanding into the field of disposable paper products, furnishes a wide variety of linen items to hotels and restaurants, as well as work uniforms to hospitals and manufacturing companies.

3-Hour Analysis Would Have Taken Months by Hand

ST LOUIS, Mo. – Computers have provided solutions to problems confronting Panama Canal Co. engineers involved in analyzing slopes of the canal.

These problem solutions are one aspect of a broad study in progress at the canal, where engineers are attempting to determine the stability of various slopes.

The Panama Canal was carved mainly through hilly country. In the past, rock slides have occurred along the canal in the area of the Continental Divide, although engineers, through continuing studies and preventive measures, have now all but precluded the possibility of a major slide interrupting canal traffic.

"Computerized analytical methods have a definite and valuable part in assessing the stability of slopes," said Col. James A. Betts, U.S. Army Corps of Engineers director of engineering and construction for the Panama Canal Co. Such analytical methods, he said, depend on the repetitive solution of a large number of problems which compare combinations of slope conditions and bracket certain values and parameters.

Computers are invaluable to the engineer in solving such large numbers of problems, a spokesman said. Each of the 27 cross sections of the canal analyzed contained about 1,000 factor-of-safety determinations that were calculated by McDonnell Automation's largest computer here in three hours of computing time. It is estimated it would have taken an engineer two and a half years.

Drug Wholesalers Get Information On Regional Sales From Data Bank

NEW YORK – Pharmaceutical manufacturers will have access to complete information on drug sales by geographical area through a computerized data system initiated by Cambridge Computer Corp.

Cambridge signed a contract with Drug Distribution Data, Inc., a subsidiary of the National Wholesale Druggists Association, to collect and process sales data from wholesale druggists for pharmaceutical manufacturers.

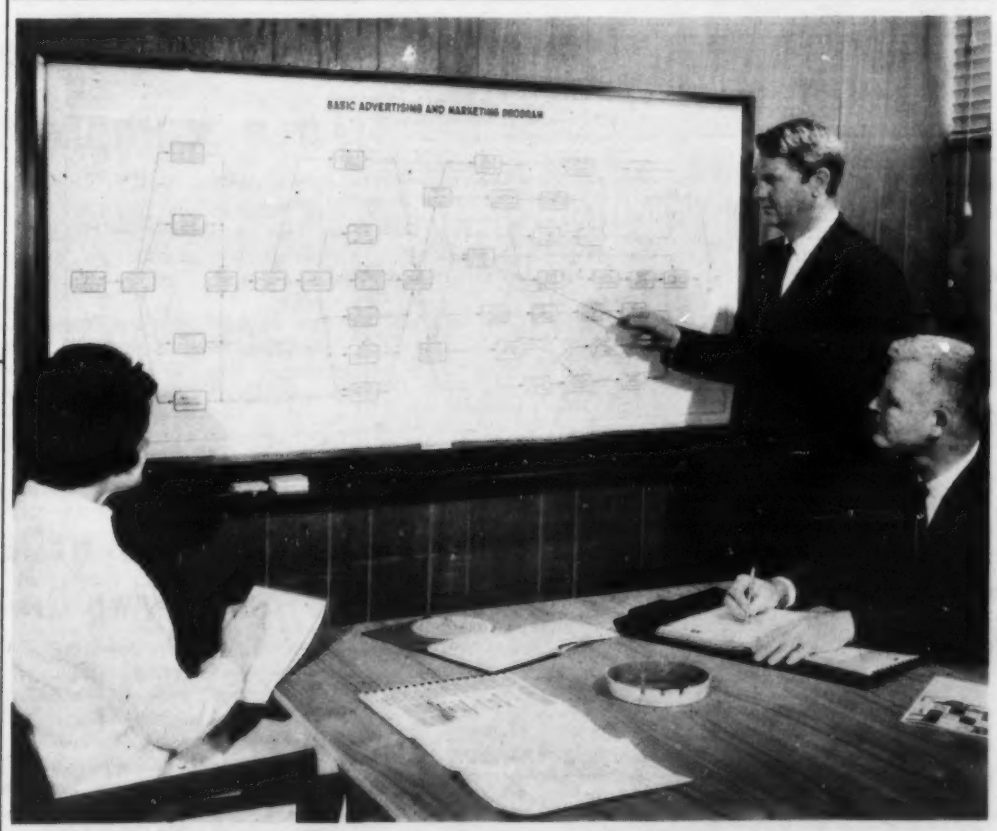
The system utilizes the resources of drug wholesalers to provide detailed information on a monthly basis.

"It assures reliable information invaluable to the manufacturer in formulating marketing and information plans and in enabling him to better direct the marketing efforts of his detail men," said Edwin A. Hammerle, Cambridge marketing vice-president.

The intitial pilot operation will concentrate on drug sales in California involving more than 60 drug wholesalers. The wholesalers will make regular reports on product movement which will be processed by Cambridge at its San Mateo, Calif., facility.

An IBM 360 at San Mateo will eventually process more than 1,000,000 invoice lines per month into the system.

According to Hammerle, the system will provide the basic information for additional market analysis reporting vital to pharmaceutical manufacturers.



Pert-- Without a Computer

A new Pert-O-Graph magnetic board has been introduced to allow Pert-style management decisions and considerations to be worked out in a conference room. The board and the blank activity blocks are magnetic. Available from Halcomb Associates, Sunnyvale, Calif.

9 Days on the Arctic Ice

Computer Scientist Gets Within 2 Miles of North Pole

By Lewis Cope

MINNEAPOLIS, Minn. – Robert Lillestrand, a research scientist at Control Data Corp., recently returned from nine busy days floating around on the ice within 20 miles of the North Pole.

Twice he got within two miles of the Pole.

What's a computer scientist doing going to the Pole, even if he is a navigation expert?

Lillestrand explained that his navigation measurements will be analyzed by a computer, and he expects to achieve location accuracies to within 100 feet or less.

The computer "is essential for the very complicated navigation experiments involved," he said. He particularly noted studying the exact path of the ice drift in that top-of-the-world region.

Lillestrand said that while he had to bring his data back this time, "small computers to do this job have just become available within the past year that in the future can be used on the ice."

He said the holdup this year was that needed software was still being developed.

The small computers will be a big boon to arctic exploration, he said, since the results will be known "on the site, telling us new questions we need to answer while we are still there."

Lillestrand said the expedition "should greatly increase our knowledge about that exciting region."

Lillestrand helped start the major geophysical, oceanographic, and weather research undertaking that was sponsored by agencies of the Canadian government.

He and the 15 fellow team members flew into the polar region in two-engine planes and set up a base camp about 20 miles from the Pole.

The group was on the ice from April 8 to the 17. The weather was a constant 20 degrees below zero during his stay.

It was daylight 24 hours a day in the Pole region, but Lillestrand could still sight stars as well as the sun for navigation sightings.

Lillestrand also made a special set of measurements with the Transit navigation satellite that should tell, with more accuracy than ever before possible, just how flattened the Earth is in the North Pole region.

It already is known that the distance from the center of the Earth to sea level is 13 miles greater at the equator than at the Pole. After computer analysis of the data, he hopes to pinpoint this figure to within a matter of yards.

The polar expedition was sponsored by Dominion Observatory and Polar Shelf Project, both Canadian government agencies.

Lillestrand is director of electro-optics research, part of the research division, at Control Data. His current work deals with computerized mapping and pattern recognition.

Minnesota Blue Cross Computer Center Offers 10 DP Applications to Hospitals

ST. PAUL, Minn. – An advanced computer-sharing arrangement is now completed and able to provide 10 advanced computer applications to hospitals throughout Minnesota.

"This program now offers a higher degree of computerization to hospitals on a larger scale than any other shared EDP hospital facility in the world," said Darrel Gubrud, vice-president for EDP of Minnesota Blue Cross.

Blue Cross operates the computer center in a cooperative arrangement with the hospitals. A Honeywell 1200 and a Honeywell 200 are used. These are separate from the computers used by Blue Cross for its own workload.

Ten hospitals in the state, located in three cities, are on-line and represent almost 25% of the state's hospital beds.

About 60 other hospitals throughout the state, many of them fairly small, send in punched cards for processing.

Computer services now offered under sharing arrangement include: patient accounting, discharged accounts receivable, preventive maintenance, property ledger, personnel, inventory, accounts payable, cost allocation, and general ledger responsibility reporting.

Most of the on-line hospitals are expected to use all of these services, while the others, in most cases, will use only a portion of them.

Jack Rivall, administrator of the on-line, 130-bed Eitel Hospital in Minneapolis, said, "It's probably the only way for a hospital of our size to avail itself of an integrated EDP system. We certainly wouldn't be able to do anything of this scope on our own."

Gubrud said it cost an on-line hospital about 85 to 90 cents a patient-day to get all 10 computer services. He said his study found that hospitals in the state with their own computers have comparable expenses of $1.25 to $1.50 per patient-day, "up to $2.25 a patient-day."

He said participating hospitals will pay $875,893 this year for the shared-computer arrangement, and Blue Cross will pay $371,660. It is advantageous to Blue Cross to have the patient billing information coming directly into it.

The Honeywell Model 1200, used as a batch processor, has eight magnetic tape drives, a card-reader, and a high-speed printer.

The Honeywell Model 200 is used for communications and has two magnetic tape drives, a high-speed printer, and two random-access drums with a total storage capacity of 7.8 million characters.

Mathematical Model Aids Thermal Pollution Study

COLUMBUS, Ohio – Hazards to fish and other aquatic life caused by thermal effluents in streams and lakes can now be better understood with a mathematical model developed at the Columbus Laboratories of Battelle Memorial Institute.

Given the appropriate input data, the mathematical tool permits ecologists to go further than heretofore possible in predicting how heated effluents upset the life systems found in freshwater lake and streams, a lab spokesman said. Until now, predictive models concerned with thermal pollution, were limited largely to predicting water temperature at a given time and distance from where the effluent was introduced.

The Battelle model, developed by Drs. Sanford G. Bloom, Arthur A. Levin, and Gilbert E. Raines, however, can actually simulate the direct and indirect response of individual aquatic species or groups of species such as herbivora, carnivora, algae, and plant debris to heat inflections. Most commercial and sport fish, such as bass and trout, are considered carnivora. The turtle is an example of an herbivore.

In the direct reactions, the scientists are concerned with the way in which the actual contact with heat affects aquatic life. For instance, does the heat destroy a particular group of herbivora? In the indirect reaction, they want to know how the initial effect carries on through the aquatic life survival cycle. For example, how does the destruction of that particular group of plant eaters affect the existence of a flesh-eating group of organisms which preyed on the now-extinct group.

The model permits the simulation of a number of such direct and indirect ecological responses that can be triggered through thermal discharge. Direct effects include: direct mortality, decreased or increased reproduction, and increased growth rate. Indirect effects include mortality to predators or preys and changes in migration patterns.

Various functions that go on in an aquatic environment and which are therefore described by the model include transfer of: heat, physical mass, and biomass. Biomass transfer includes the feeding habits and migration patterns of the various aquatic species. Parameters considered are: velocities, disperson coefficients, and various rate coefficients.

Understanding aquatic ecosystems and their complex responses to thermal effluents will become more important as the need for electrical power increases, say the model designers. This is due to the fact that large quantities of water are required in the cooling stages of power generating facilities.

Iowa Legislators On-Line To a Remote Data Bank

DES MOINES, Iowa – Iowa's state senators and representatives are using computer-linked visual display terminals for instant research on legislative proceedings.

The display units, stationed near the House and Senate chambers and in other key government offices, are connected by telephone lines to an IBM 360/40 which stores the legislative data.

Serge Garrison, director of legislative research, said volume on the information network is expected to reach 1,000 inquiries a day.

Garrison said a total of 33 of the IBM 2260 terminals are presently installed. In addition to the four terminals serving the legislature, units are located in the offices of the governor, the State Insurance Commission and the comptroller, as well as in the departments of revenue and finance.

Computer Controlled Sex Spreads To Nationwide Breeding of Cattle

NEW YORK – Computer controlled sex is spreading. A nationwide network of cattle breeding farms is now using an on-line system to schedule breeding periods of cows and bulls.

Programming Methods, Inc. developed the system for Black Watch Farms. The system automatically prepares morning reports for each ranch location detailing the tasks for that day. The status of each cow is reviewed by the computer each day, and impregnation schedules, follow-up procedures, and other tasks are created for the ranch hands.

As required, statistical and status reports are created and investors are notified of the current status of their herd.

The system is being implemented on a combination of IBM 360 and SDS 940 real-time computer equipment.

On-line Teletype terminals are employed for the data gathering and disseminating function.

Computer 'Doing Fine' After Third Crossing

NEW YORK – The Queen Elizabeth returned to New York after her third Atlantic crossing, and her crew reported that her Ferranti Argus 400 computer was "doing fine." The report was of more than passing interest, because the computer was designed to play a major role in the operation of the ship and indirectly in maintaining the pride of British shipping in general.

The old Queen Elizabeth and her sister ship, the Queen Mary, had been beaten after 30 years, not because they were unseaworthy, but simply because they were unable to compete economically with the speed of jet planes. They provided superb service, but provided it expensively. They were unable to take advantage of opportunities to make savings because there was no effective system for informing the people responsible in time for them to act.

Dual Role

The role of the Ferranti Argus lies in providing just such an opportunity. Cunard Lines says it is the most sophisticated computer ever installed in a merchant ship and specifically, that it is the first to combine technical and commercial operations at sea.

On the technical side, it can select the proper course for the ship to bring her into port on time with minimum fuel usage. It takes into account the water flow of the various Atlantic currents, the weather reports from the Earth satellites, and other details. In selecting the courses, however, it does not usurp the captain's position. When necessary, it will provide three choices and let him select the one he wants.

In facing a storm, for instance, the computer will find one route around it, another straight through it, and a third based on the least expensive route. At the same time, thinking of passenger comfort, it will tell the captain just how bad the waves are likely to be and how much discomfort the passengers will experience if he chooses the course through the storm.

The passengers' comfort is also considered in such simple matters as hot water, for instance. The Ferranti system looks after heating the water and bases the amount of heat required on the time of day and on how much hot water is actually being used. As a result, it is hoped that there will still be hot water even when everyone simultaneously decides to take a hot shower.

This possibility is not an entirely unknown occurrence. Times shortly after departure and immediately before arrival have been found to create this type of housekeeping problem.

The cost of the computer system over and above the conventional data logging has been estimated at $135,000. Cunard expects to recover it in two or three years.

The Queen Elizabeth II gets help from some tugs as she docks in New York. (Wide World Photo)

Computerized Blood Test Developed by Engineers

CAMBRIDGE, Mass. – Electrical engineers at MIT have demonstrated the feasibility of a computerized technique for administering a common type of blood test.

Specifically, the automated technique can identify the five principal types of white blood cells through spotting differences in color, shape, and texture. Identification of the white cells, and the noting of variations from the norm in quantity, is a widely used diagnostic test for infections, allergies, leukemia, typhoid fever, and certain types of poisoning.

90-95% Success

The computerized technique was developed by Prof. Murray Eden and doctoral candidate Ian T. Young, both of MIT's Research Laboratory of Electronics. The researchers have reported that the technique is 95% successful in locating white blood cells amid vast fields of red cells and platelets, and 90% accurate in sorting the cells into the five types.

The development was reported for the first time last month at the annual review of RLE research for the Joint Services Technical Advisory Committee (which, together with the National Institutes of Health, sponsored the Eden-Young research).

Manual counting of white blood cells consumes thousands of man hours and an estimated $200 million annually. A computerized replacement – which Young hopes might eventually be connected directly to the microscope – would be faster, more accurate, and less expensive.

Color Optical Scanner

Important in the development of the technique was a color electro-optical scanner (one of the few in existence) developed by Oleh Tretiak, an MIT lecturer in electrical engineering. The scanner converts data on color slides into digitized electronic signals which may be stored on magnetic tape.

An interesting sidelight of the technique is that essentially the same errors made by humans in the manual operation are made by the computer. Consequently, Eden and Young have roughly duplicated by computer a certain type of human behavior.

Airborne EDP Command System Tested

HANSCOM FIELD, Mass. – A Strategic Air Command airborne command post outfitted with a new EDP system is undergoing preliminary flight tests by the Electronic Systems Division of the Air Force Systems Command. The system is designed to help SAC commanders direct their retaliatory forces.

The division is flying the aircraft from Hanscom Field as the first step in a two-year program to explore the application of EDP equipment for airborne "command control" purposes.

The test plane is a four-jet, EC-135 "Looking Glass" aircraft that is part of the SAC command fleet.

Maj. Albert Pikul, director of the flight-test program for the Electronic Systems Division, said, "When the plane finishes its program here this week, it will go back to SAC and take its position in the regular Looking Glass cycle of flights so we can compare the performance of the automated system with SAC's current system."

Under this ESD program, off-the-shelf equipment was installed in the "Looking Glass" aircraft by the RCA Aerospace Systems Division, Burlington, Mass. The program is formally known as the Post Attack Command Control System-Airborne Data Automation (PACCS-ADA).

Major parts of the PACCS-ADA equipment include RCA's Variable Instruction Computer (VIC), a compact, high-speed, high-capacity, general-purpose computer; the largest rotating drum memory (100 million bits) used in airborne applications; five RCA video data display units; and data tapes and printers.

"This is a challenging program," he said, "because this is a one-of-a-kind system. There isn't anything to fall back on for background or assistance. It's been a learning process for all of us, and we'll learn a lot more about how military decision makers operate in an automated airborne environment during the test program."

Equipment in the PACCS-ADA aircraft was first tested in RCA's Burlington facility before being installed in the EC-135 at nearby Hanscom Field. Although the equipment was not specifically developed for the program, some modifications were made to adapt it to the aircraft.

One of the prime goals of the test program is to explore the "man-machine interface" problems that might occur, the major continued.

"Here we have all the equipment. The operators must perform certain functions, getting information for decision-making from the equipment. We will learn whether the data the operators obtain is usable and proper and whether it interfaces nicely with man's ability to do this job," Major Pikul stated.

Farmers Use Time-Sharing System To Watch Their Profit Margins

QUINCY, Wash. – Farming in Washington State is going time-sharing and is getting its own terminal and its own computer programs. Dwarf Orchard Development Co. is emphasizing cost accounting rather than the routine operations done on general computers. The firm feels that for this function a time-shared operation has many advantages.

Williard F. Hess, general manager, told CW that the farming area was not currently being touched because there are very few people who understand both agriculture and data processing. But they hope to crack this nut, he said.

Lean Margins Involved

The company uses Tymshare systems and has found that margins are lean in farming. The program provides farmers with computer-generated reports of labor costs which are directed both to the farmer and to his lending institution to create a firm basis for financial decisions.

In the future, the firm expects to offer new systems and improvements such as a spray-analysis program to choose the least expensive plant-disease control chemical.

Tymshare Pleased

Tymshare officials say they are quite pleased with the operation because, as they point out, when a farmer becomes a user of the farm management program he also becomes a user of Tymshare equipment.

Firm Will Offer Microfilmer Tape-to-Print Service

ROCHESTER, N.Y.-Xerographic Copy Service, Inc. will become one of the first business services in the Northeast with a Kodak KOM-90 that will print data from computer tape 20-to-40 times faster than conventional methods, according to the company.

William C. Wygant, president of Xerographic Copy Service, said, "The purchase of the KOM-90 means many firms will be able to take advantage of the most advanced computer printout technology without a heavy cash outlay."

The KOM-90 microfilmer decodes data from computer magnetic tape and photographs the images directly onto 16mm microfilm at the rate of 90,000 char/sec.

The computer output film has many advantages, such as processing speed, elimination of much storage space, variety of forms, lowered material costs, and quick retrieval.

Xerographic Copy Service customers will also have the option of quantity paper copies made from the microfilm or film copies or reels, magazines, microstrips, Dekastrips, and other types of microfiche.

Conventional printout procedures, while being slower, can print out only reams of paper which must be stored.

Wygant noted that retrieval time will be faster with Xerographic Copy Services' KOM-90. "Less than 10% of computer printout is ever needed for informational purposes again," he said. "It's obviously a monumental task to get at the information quickly. KOM-90 assures convenient storage and instant retrieval."

Wygant said that his firm is now inspecting locations in Rochester, Buffalo, and Pittsburgh for installation of the microfilmer, to be installed later this year.

The firm also is expanding the number of Co-op Copy Stations it operates throughout the country and is broadening its product line of office supplies.

Computerized Management System Ready for Printers

PRINCETON, N.J. – The development of the PMIS (printing management information system), a service that offers printers the advantages of computerized business systems without the costs and problems associated with buying a computer, is now in operation.

According to the company, PMIS gives the printer detailed, accurate, and timely reports on job costing, work in process, production analysis (by operation and by employee), profit analysis, and sales analysis.

The PMIS service is available to printers in the New York metropolitan area either from the New York office of Printing Industry Computer Associates at Two Penn Plaza or from the Princeton, N.J., office at 228 Alexander.

U. S. Systems Offers EDP System for Laboratories

LOS ANGELES – U.S. Systems & Software, Inc. has developed and is offering to clinical laboratories a computerized system which records and stores data from instrumented test devices, makes instant access to all recorded tests on any given patient available to physicians, and, in addition, processes accounting and billing for laboratory charges.

The computer printout supplies the data on which each test was run, together with the doctor's and patient's names.

U. S. Systems installs at the laboratory site a DEC PDP-12 computer as part of the package. Charges for the service are based upon volume.

Harry Marsh, a biochemist, formerly with Technicon Corp., and at one time head of a major clinical laboratory in Southern California, has been named head of U. S. Systems' medical data services division, which handles the computerized clinical laboratory service.

Greyhound Computer Corp. To Open Cleveland Center

CLEVELAND – Greyhound Computer Corp. has announced plans to open a major data service center, its third nationally, in Cleveland.

Ryal R. Poppa, vice-president for data services as well as president of Greyhound Time-Sharing Corp., said he hopes the Cleveland center will be operational by mid-July.

It will employ 50 persons "within 18 months," he said.

Major data service centers were opened in 1968 at the Chicago headquarters of the Greyhound Corp. subsidiary, and at San Francisco. Their revenues projected for 1969 are nearly $4 million.

Poppa said the Cleveland data service center will offer "time sales, project management, time-sharing, and service bureau applications."

Services

He said the Cleveland center, to be located at an unannounced location now undergoing inspection – "less than two miles from Public Square and a few blocks from major exits and entrances to the Main Belt Expressway" – will operate on a 24-hour, seven-day-a-week basis.

Facilities Division Features Expertise

NEW YORK – An unusual feature of the new data facilities division of Diversified Data Services and Sciences Inc. is the availability of programmers and systems analysts at the midtown Manhattan location to assist time-leasing clients in solving program problems.

The data facilities division offers prime time from 9a.m. to 5 p.m. second and third shifts, and special weekend accommodations.

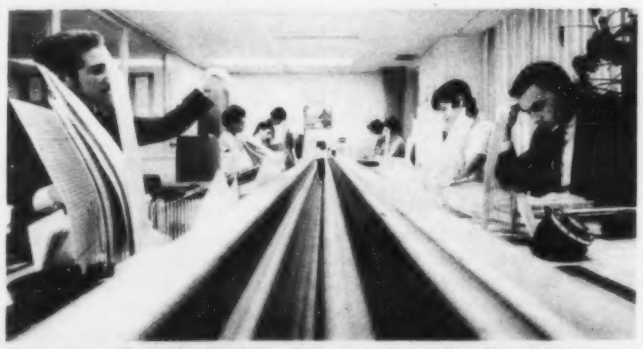
The configuration includes an IBM 360/40 with 128K memory, a 2540, 2401s (Model 5, 9-track and Model 2, 7-track drive), three 2311s, and a 1403

IBM's Midtown Manhattan Service Area Utilizes Latest Automated Dispatching

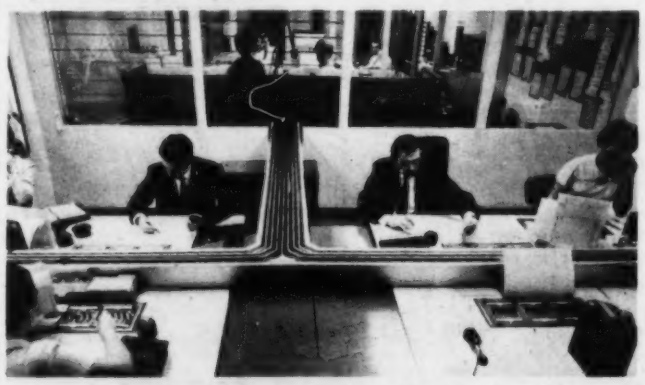
NEW YORK – When customers call IBM's field engineering offices in midtown Manhattan, they may require information, minor adjustments to their data processing equipment, emergency service, or parts replacement.

No matter which of these the customer requires, the field engineering division, which installs and services IBM's data processing systems and equipment, wants its customer engineers to handle calls quickly.

To accelerate response, IBM's midtown offices at Madison Ave. and 42nd Street employ a unique method for reaching and dispatching their customer engineers, scattered throughout the city working at customer locations.



Incoming dispatch card is delivered to radio dispatcher who signals a customer engineer.



Customer service calls on cards are carried to the radio room (rear) on an eight-lane "expressway conveyor."

When customer service requests come into the IBM midtown Manhattan office, dispatchers enter requests on cards which are then placed on a conveyor system.

With a new conveyor-radio dispatch system, a request for service can be relayed to the customer engineer regardless of his location, within minutes after the customer calls the IBM office.

A dispatcher enters the information on a card which he then places on a multilane conveyor belt resembling a moving model of an expressway.

The card moves quickly to a radio room where another dispatcher transmits verbal instructions to an IBM customer engineer carrying a compact radio receiver on his belt.

The brief voice transmission from the radio dispatcher relays the necessary information to the customer engineer enabling him to telephone or go directly to the customer requesting help. Radio dispatching not only speeds up response to calls, but saves time by eliminating the interruptions of being called to the phone at a customer location.

Another advantage of radio dispatch is the capability of intercepting a customer engineer en route. With radio dispatch, he can be reached in an elevator, in a cab, or on the street. No time is lost on unnecessary calls.

The dispatcher relays all necessary information to the engineer anywhere in Mahattan.

ABM Beyond State of Software the Art, Expert Says

Continued from Page 1

report, "The computers involved in ABM systems would be the largest and most complex ever built. The proposed system would include 20 data processing units and have a capacity equivalent to 100 large commercial computers." The programming would be "more sophisticated and complex than any accomplished so far," and presents problems "not yet solved even on a theoretical level," particularly in the area of proving that a program fulfills its assigned task.

The computers would:

- Interpret radar signals.
- Identify potential targets.
- Track incoming objects.
- Predict trajectories.
- Distinguish between warheads and decoys.
- Reject signals from earlier nuclear explosions.
- Correct for blackout effects.
- Allocate, launch, and guide interceptor missiles.
- Arm missiles if they get within range of a target.

All of this would be done within the 10 minutes between the time attacking missiles are sighted and the time when they must be intercepted. In addition, 10 to 15% of the computer time would be for self-checking.

Advances Often Required

Substantial advances are frequently required, says the report, because designers of new weapons systems use the "most sophisticated forms of technology – even when that technology is only at the earliest stages of development." The report notes that this is particularly true of the Safeguard computer elements.

But the report also notes, "The result of this attempt to stay on the frontier of technology is that weapons systems consistently fail to live up to expectations, and their reliability is especially inadequate." The report cites a Budget Bureau study of weapons systems that required a major advance in either radar or computers. Of 11 such systems designed between 1960 and 1967, only two met performance specifications, one reached 75%, two reached 50%, and six reached only to 25%.

The report continues that "unreliability of anything approaching the magnitude suggested by the experience reviewed above would be wholly unacceptable," but notes grimly that "there is little reason to suppose that the Sentinel/Safeguard will better the average of these other systems, and some grounds for thinking it may do even worse."

Special Section on Computers

The special section of the report devoted to computers was written by Licklider, head of MIT's Project Mac, which developed one of the most advanced time-sharing systems.

Licklider points out that the problems of weapons systems are not unique, and that other and time are "grossly underestimated." He cites a study that shows "complex electronic systems typically cost 200 to 300% more than the Pentagon estimates and generally are turned out two years later than promised."

One of the reasons for delay, complex systems, including airline reservation systems and the telephone company's electronic switching system, have similar problems.

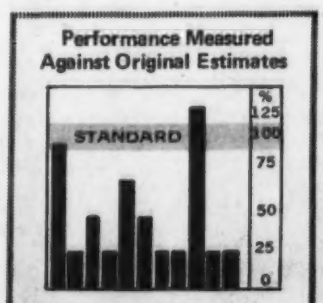
Bugs Inevitable

Applying past experience on advanced systems to the ABM, Licklider states that "no matter how simple and straightforward it is expected to be, the ABM software will turn out to be very complex, continually in the process of revision, and never free of bugs."

The bugs are the result of the complexity and are inevitable; they are "not evidence of poor workmanship on the part of the programmers." Licklider declares flatly: "All large computer systems that exist contain bugs. There is no prospect of wholly perfecting any large software system in the next decade."

Saccs (Strategic Air Command Control System) "showed dramatically that, when software gets very complex, you can pour more and more men and money into it without causing it to be completed. The programs get more and more complicated but not more and more operable. You begin to understand the possibility that they may literally never be debugged and integrated."

Licklider warns: "To put Saccs-like software into an ABM system would be folly – potentially hideous folly. To put perfected software into an ABM system would be – and this is the consensus of experienced systems programmers – impossible."



100% = promised performance standard. Systems are classified, and exact identification is not available.

Testing Required, But Impossible

Because of the bugs, successful systems such as those used in the Apollo moon flights involve extensive testing and revision. But it will never be possible to adequately test an ABM system, Licklider argues, because we do not know what form an enemy attack will take, and we cannot explode nuclear warheads as part of the test. He notes that the telephone company's electronic switching system was "deployed successfully only with much trial and error and gradual progression," He then asks: "How can one expect to make the much more radical ABM electronics work the first time."

But Licklider also charges that at the same time that performance is overestimated, costs according to Licklider, is inaccurate predictions of programming time required. The extreme case is the Sage defense system against manned bomber attack, where "the number of man-years of programming required was underestimated by 6,000 at a time when there were only 1,000 programmers in the world."

J.C.R. Licklider

Jerome Wiesner

Eight Years to Program?

Large programming tasks which involve many programmers and many revisions limit programmers to 160 instructions per month per man, he reports, and further suggests that as the group becomes larger, productivity decreases. He concludes that it may not be possible to produce more than 10,000 to 20,000 instructions per month on a project such as this no matter how many programmers are hired. At this rate, the software for a 10-million instruction ABM subsystem would take four to eight years to produce.

The report is now available in bookstores. Hardback edition (Harper and Row) costs $5.95, while the paperback (New American Library) costs 95 cents.

The introduction to the report is written by Kennedy. He declares in it that the ABM "is the single most complex undertaking man has yet set for himself in his time on earth – but if experience with previous national defense projects teaches any lesson, it will be years late in completion and may never work."

General Electric Plans Major Expansion Of Various Service Bureau Activities

BETHESDA, Md. – Concurrent with the development of its computer network (see page 1), GE is extending its worldwide marketing of conversational time-sharing and is introducing new on-line and customer-support services.

Describing some of these plans, GE's Paul W. Sage cited the following:

An additional $20 million is now being invested to expand the availability of time-sharing services outside the U.S. This, coupled with the $34 million U.S. investment announced last week, means that by year-end more than 75 systems will be installed worldwide for subscribers in 17 countries on five continents.

Additional GE-600 series systems will be installed to double the capacity for Mark II service in the U.S. These systems will be installed in centers such as a new Teaneck, N.J., facility scheduled for dedication in late June, GE said.

A new on-line batch-processing service called 3D Resource is now being marketed in the Washington and Philadelphia areas. The service will be available on a national basis by year-end.

Customer support will be expanded by offering additional GE application programs and a new Datanet software service which makes available programs developed by industry experts.

Noting that "many companies have mastered computing," Sage said the network goes beyond this stage by integrating communications systems and computers into a total service offering.

"GE is committing substantial technical, financial, and managerial resources to a business which by 1975 will be as consumer-oriented as telephones, electrical appliances, and automobiles.

"Our emphasis is on understanding the customer and providing a complete on-line service which meets his total needs at work, in school, and before long, in his home."

Discussing the national computer network, Sage said it will have a major impact on the growth of subscription on-line services as a consumer product.

Initial use is expected to be by firms doing business in many locations throughout the country. From terminals in their offices, people in each location who have perhaps never used computers in thier work will be able to dial a local telephone number to access the same computer system's centrally stored information and proprietary application programs.

Data such as each office's sales for a given time period can be transmitted to, and stored on, the same remote computer. The firm's headquarters staff can immediately use the information to prepare timely financial reports, sales forecasts, and analyses of current operations.

Looking to the future, Sage said GE is developing a successful business of "bringing computers to people" by expanding its base of time-sharing service sales and introducing new on-line capabilities and customer support services.

Conversational time-sharing: Two complementary services, Mark I on GE-200 series systems, and Mark II on GE-600 systems are now being marketed. These services will be expanded internationally during 1969-1970. The present Los Angeles center will be expanded and new centers in Chicago and Boston will be established. The new Teaneck facility will provide additional capacity to East Coast subscribers.

On-line batch processing: A new 3D Resource service is now being marketed in the Washington and Philadelphia metropolitan areas. The service, based on a GE-600 series system with Gecos III operating software, enables subscribers to solve their entire data processing problems on a single system and to use a common data base. Remote batch processing is available from either a small computer such as a GE-115 or teletypewriter at a customer's location. Local batch processing can be executed at the GE-600 site. Conversational time-sharing is provided through teletypewriter terminals. All three modes can be accomplished concurrently.

Application services: This service minimizes the need for customers to develop their own computer programs

$1.30 a day

[Except February, $1.39 a day.]

But to make it a little easier for all of us, we'll bill you at the rate of $39 a month. That's all it costs to rent a System 21 computer station with a microprocessor, two data recorders, typewriter/key punch keyboard and a video display.

Communications, hard copy and color display capabilities are optional.

Everything you need for a complete data input and communication network. Links your computer with every desk where data is gathered or processed.

The VIATRON rental agreement contains a 30-day cancellation clause and provides you, at no charge, with two standby units with every fifty you rent. If you have any problems, all you do is unplug the unit and plug in a new one. (If you rent fewer than 50 units, backups are available at 75 per cent of monthly rentals. Or, we will ship a replacement within four hours of notification.)

If you'd like a copy of this rental agreement and a complete rundown of System 21 capabilities write VIATRON Computer Systems Corporation, Dept. C-12, Route 62, Bedford, Massachusetts 01730. Or, telephone (617) 275-6100. We'll show you how to pinch pennies.

VIATRON

SYSTEM 21

VIATRON System 21 puts the logic where the problem is

Credit Authorizations Are Given In About 30 Seconds, Bank Says

BUFFALO, N.Y. – Marine Midland Banks, Inc. is employing a computer to eliminate delays in obtaining credit authorization for Marine Midland Master Charge card holders in western New York. The system is being expanded to all of New York state during 1969.

Before the RCA Spectra 70/45 computer was installed, the time required to obtain authorization was often several minutes, a bank spokesman said. Now the computer answers more than 1,000 of these inquiries every day at an average time of about 30 seconds each, he said.

The computer also has been programmed to refer nonroutine credit decisions to experienced credit-authorization supervisors. This can occur, for example, if the desired purchase is larger than the customer's available credit balance, or if the customer has reported his credit card stolen.

The computer will automatically display the card holder's status report on a video data terminal for the supervisor. She evaluates the credit history and, if the facts warrant it, authorizes the purchase.

By utilizing this "human override" feature, Marine Midland can provide efficient automated service and guarantee that no customer will be handled discourteously without appeal to human understanding and judgment.

When a card holder wants to make a purchase at a member establishment, he gives his card to the merchant, who telephones the Marine Midland credit authorization department. The merchant reads the card holder's name and credit card number to a clerk who types this information on an RCA video data terminal. The terminal transmits the information to the computer, which checks the file in its memory and replies. On the average, on 30 seconds elapse from the time the merchant contacts the clerk until he receives his answer, the spokesman said.

More than 90% of the inquiries to the computer are answered with an approval and a credit authorization number, he said. This tells the merchant that the card holder is authorized to make a credit purchase of the requested amount.

In some cases, a restraint code is displayed, indicating, for example, that the card is stolen. With this information, the merchant can prevent the purchase and take the proper action to recover the card.

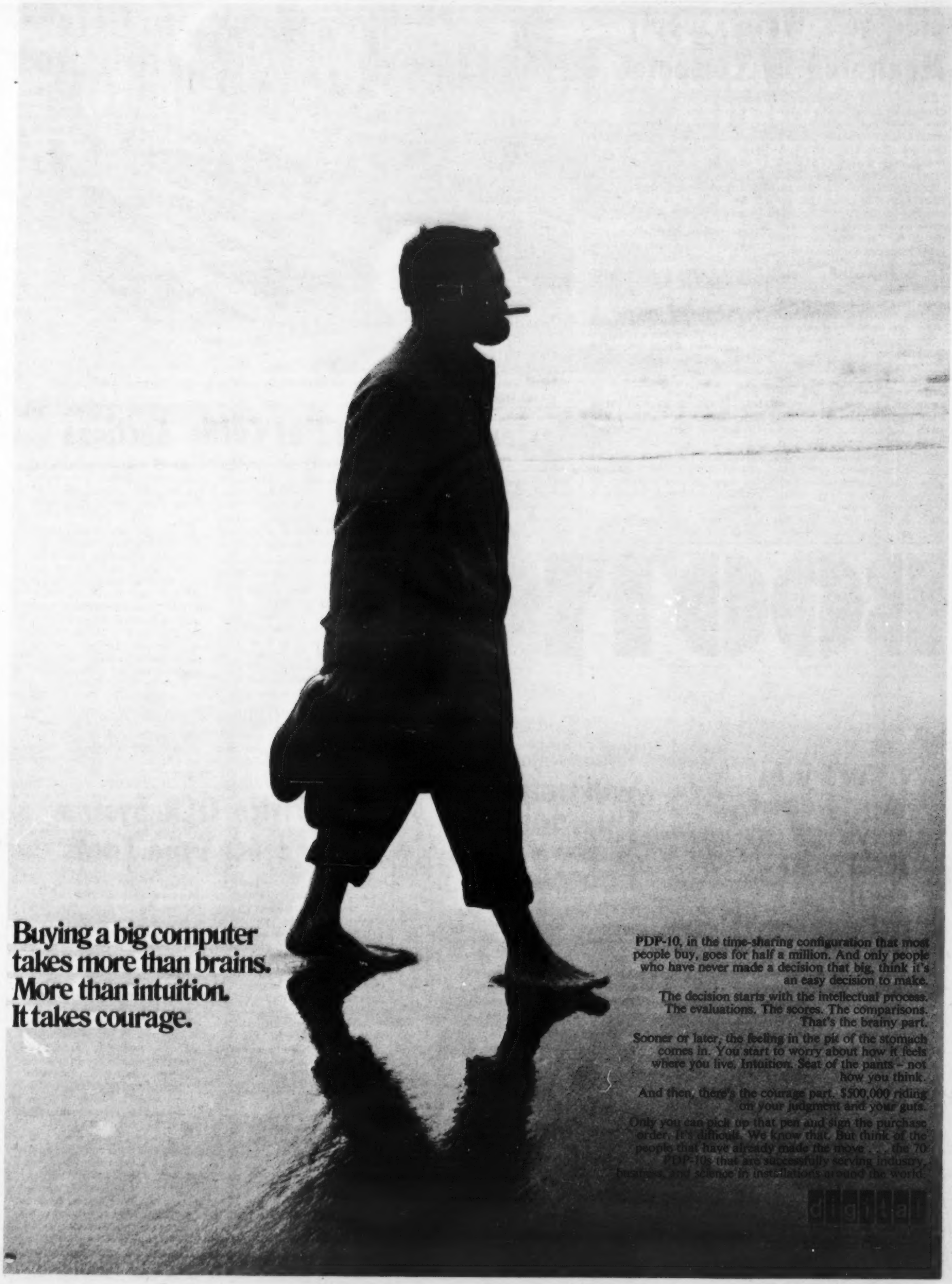
Credit Reporting

The system has another feature – one that is important to the Marine Midlands Banks, as well as to their customers. It is the ability to check a card holder's credit by inputting his name and address. This not only allows Marine Midland to service a customer without actually having his credit card number, but it also facilitates the development of a computerized name and address file for each customer. This file is the first step in building an automated central information file consolidating all Marine Midland's bank records.

Currently Marine Midland can retrieve computerized customer records only by account number. When customers have savings accounts, demand deposit accounts, loans, charge cards, and other accounts, a clerk has to check each file separately. It is also necessary to know each account number.

When completed, the central information file will permit key bank personnel to obtain instant information on any of Marine Midland's more than one million customers. They will transmit the name and address to the computer and it will supply a full description of the bank's relationship with that customer. This new dimension in banking will provide faster and more efficient service for customers.

Marine Midland Services Corp. is operating the credit authorization system on one Spectra 70/45. Eight other RCA Spectra 70s have been ordered to form a statewide computerized information processing network. The network will link the central information file with Marine Midland's 11 full-service banks and 231 offices throughout New York state.


Buying a big computer
takes more than brains.
More than intuition.
It takes courage.
PDP-10, in the time-sharing configuration that most people buy, goes for half a million. And only people who have never made a decision that big, think it's an easy decision to make.
The decision starts with the intellectual process. The evaluations. The scores. The comparisons. That's the brainy part.
Sooner or later, the feeling in the pit of the stomach comes in. You start to worry about how it feels where you live. Intuition. Seat of the pants – not how you think.
And then, there's the courage part. $500,000 riding on your judgment and your guts.
Only you can pick up that pen and sign the purchase order. It's difficult. We know that. But think of the people that have already made the move . . . the 70 PDP-10s that are successfully serving industry, business, and science in installations around the world.
digital

Chicago's Water Supply Monitored by Computer

CHICAGO – A computer at Chicago's Central Water Filtration Plant permits electronic surveillance of the nearly one billion gallons of water which daily flow through the plant's 51 acres of purification equipment.

Remote sensing devices at more than 300 points in the process feed data to an IBM 1800 on the quality and quantity of the Lake Michigan water being processed for almost three million residents of Chicago and some 40 suburbs.

Staff engineers at the huge water treatment facility depend on the electronic sensing network for up-to-the-minute reports on quality levels in the incoming water.

Other reports printed on terminals include data on filter performance, amount and concentration of chemicals being used for purification, reservoir levels, and weather conditions.

The sensors continually measure these factors to help insure the highest quality water possible. The computer also compares readings of key instruments with preset standards. Any deviation from standard readings triggers an off-normal report to supervisors who decide on corrections.

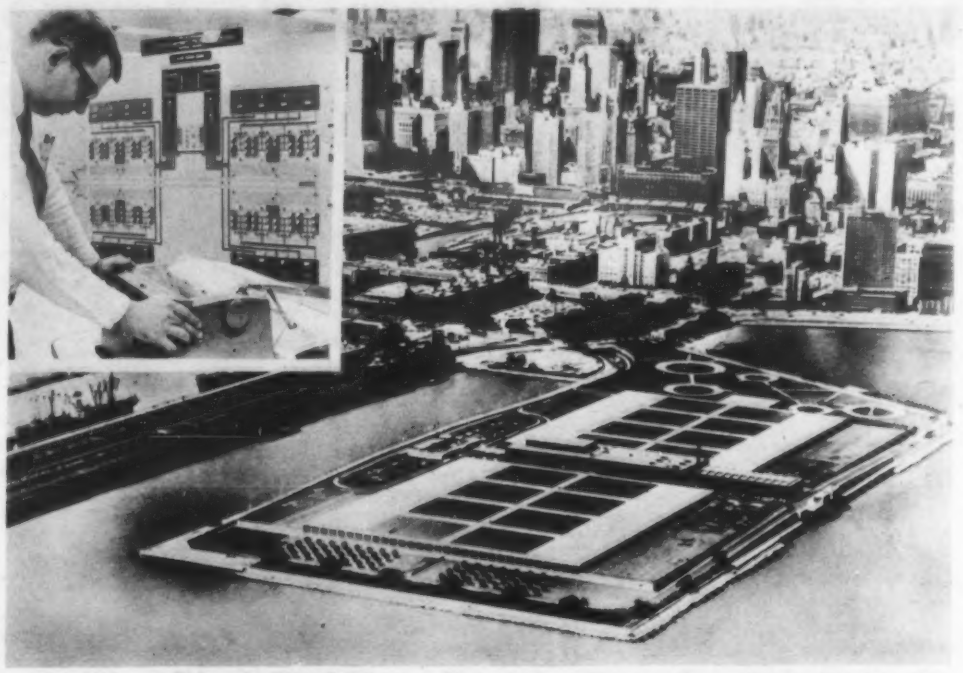
Since the computer constantly watches the entire operation, the men can devote their time to correcting abnormal situations and to experimentation with new purification procedures.

Provides Storm Warning

One such abnormal situation, a plant spokesman said, would occur if an instrument suddenly showed a sharp decrease in the quality level of incoming water. This condition, which could be caused by a storm stirring up the lake, would immediately be called to the supervisor's attention for corrective action. The 1800 checks the instruments for variation from normal every two minutes.

To gather all other operating data, the computer polls each of the sensors every two minutes. The electronic messages are converted into numbers which are printed in report form hourly on the control room terminal. At midnight, a 24-hour summary is printed.

Supervisors can make inquiries via an IBM 1092 keyboard.



An engineer at Chicago's Central Filtration Plant checks printout on the quality level in the water of Lake Michigan.

System Rides Herd at Cattle Auctions

SEALY, Texas – Keeping track of huge numbers of cattle buyers, sellers, bids, and several thousand head of cattle during an auction can be a pretty involved task.

To help keep tabs on which animal goes where, who bought what and who owes how much, the Port City Stockyards is now using an IBM computer to handle the complicated accounting associated with a large auction.

The Port City Stockyards disposes of an average of 5,000 head of livestock during each three-day auction week.

Each animal to be auctioned is tagged on arrival at the Port City Stockyard and its number is fed into an IBM 1130 computing system. Information is sent from the auction yards to the computer area by pneumatic tube.

When the animal is sold, the computer compiles a record of its weight, the selling price, additional handling charges, and the names of the seller and buyer.

After a rancher's cattle have been sold, a printer attached to the computer prepares his payment check and a transaction list.

Correspondingly, when a buyer has finished his bidding, the computer prepares a list of his transactions, with details on each head he bought, its price, and the pen location of each animal. It also prints an invoice showing how much he owes.

At the end of each auction day, the computer compiles and prints a detailed statistical breakdown of the day's transactions.

"Prior to using the system, it was several hours after the sale before we could close and balance the day's transactions," said J.D. Sartwelle Sr., president of Port City Stockyard. "Now we will be able to do this within minutes."

Post Office OCR System To Read 60 Type Faces

COLUMBUS, Ohio – Fast, accurate, and efficient sorting of U.S. mail is the ultimate goal of a research program on advanced character recognition techniques for use in address reading machines. The one-year, $90,000 study, funded by the Post Office Department, is under way at the Columbus Laboratories of Battelle Memorial Institute.

A system capable of accepting more than 90% of the mail passing the electronic scanner is the goal of a research team headed by Battelle's Dr. J. Douglas Hill. The group is aiming for a correct reading level of at least 99%.

"Reading machines now in operation, which will read up to about 36,000 pieces per hour, have comparable accuracy but accept considerably less mail," Dr. Hill notes.

Two electro-optical recognition techniques are being considered for translating the printed characters into electronic signals that command large electromechanical sorting machines.

One of the techniques involves electronically producing the mathematical equation of the curves that describe the character's outline.

The second technique under consideration is based on statistical methods of extracting distinguishing features of characters.

Although the automatic sorting machine far outstrips man in the amount of mail sorted, problems do arise to hamper the machine's efficiency when it scans addresses imperfectly printed or located. Problems include the "window" envelope with an off-center address, smudged or unclear addresses, and characters out of line.

In addition to reading the basic letters and numerals, the recognition system is being designed to read a wide variety of type faces. This will include the type faces commonly used on label printing machines, billing machines, and typewriters. The researchers are working with a Post Office Department data base of 100,000 characters comprising more than 60 type faces.

Service Stores Medical Records For Fast Retrieval Day or Night

WAYNE, N.J. – The immediate availability of individual medical profiles is offered by the World Medical Data Bank as an addition to personal security plans provided by companies, unions, and trade, professional, and other organizations.

Medicron World Medical Data Bank, a division of Command Control, Inc., will record and store the individual medical histories for a lifetime registration fee of $13. There is an annual maintenance fee of $1 per name, but updating the medical data, no matter how often it may be required, is free. Family lifetime registrations are $21, with a $2 annual maintenance fee.

The personal assurance service has its basis in a specially designed computerized system for recording and storing up to 102 facts, including blood type, allergies, special conditions and prescriptions, sensitivities, chronic illnesses, and electrocardiograms. Access for the physician is by phone, at any time, from anywhere in the world.

The plan is equally applicable, says Martin L. Ludwig, president of Command Control, to in-plant employees who are now also traveling more than ever before as it is to management and sales personnel constantly on the road for business purposes.

Members, who are issued a wallet-size identification card containing their name and membership number and the telephone number of the direct line to the Medical Data Bank, are also automatically eligible to receive warnings of possible health problems if their medical profile indicates they are in or approaching a group that has a high percentage of people with a certain medical problem.

The Medical Early Warning System (Mews) is triggered by statistical facts from such sources as the U.S. Department of Health, recognized medical research groups, and the research done at the World Medical Data Bank, developed as part of a continuing research project on more than 126,000 people.

EDP Helps Jobs Find Candidates

NEW YORK – A computerized employment system has been set up to search out candidates in America for the expanding number of professional jobs in Israel.

The Committee on Manpower Opportunities will utilize the system to "retrieve" American and Canadian professionals for jobs in Israel. The Government Bureau for Israeli Professionals will use it to keep track of the educational and professional experience of Israeli nationals studying or working here, for the ultimate purpose of placing them in the rapidly multiplying number of positions calling for advanced education and specialized professional skills.

The system, put into operation last month, was designed by Employment Systems, Inc. here. The key to the system is a portable audio computer terminal coded for 2,000 different skills and interests, and linked to a central IBM 360/40 computer in Detroit which houses the data base.

Computer-Printed Plastic Credit Cards Speed Check Cashing at Supermarkets

MADISON HEIGHTS, Mich. – A development in computer processing on plastic that addresses personalized identification cards directly from computer tapes will help Southern California supermarket shoppers cash more than 65 million checks this year.

The 2B System Corp. will supply 3.5 million plastic Welcome Check cards preattached to continuous forms for direct computer printout to Telecredit, Inc. of Los Angeles.

Telecredit is mailing the plastic check-verification cards to supermarket chain store customers from Santa Maria south to the Mexican border. The company expects to cover the entire state by year-end. Welcome Check cards bear the name and number of the store at which the customer applied, and enable card holders to cash checks without the store manager's approval in the store of issue. When cards are presented at stores other than the store of issue, the manager will telephone Telecredit for verification of customer's check cashing history. The computer center is operated night and day, seven days a week, and can verify checks in 20 seconds. The consumer pays only a small fee when the check is written for more than the amount of purchase, or is cashed without a sale.

Alex M. Beerbohm, president of 2B System, said that before his system was perfected, production was limited to embossed plastic cards individually typed at the rate of approximately 2,500 in 24 hours. "Using three production shifts around the clock, it is possible to process 2B System cards ready for mailing at the rate of one million a day, and at a cost about half that of the embossed cards," he said.

System Will Aid Railroad Repairs

JACKSONVILLE, Fla. – Seaboard Coast Line expects to become the first railroad to use a computer to diagnose the repair and maintenance needs of locomotives while they are on the move.

It will be comparable to measuring the heartbeat, blood pressure, temperature, nervous system, and other functions of the human body while running at top speed.

Electronic monitoring equipment, designed by IBM to record the performance of 96 operating functions of a diesel engine, will be installed on 20 powerful locomotives that will begin service on SCL tracks by January 1970.

Performance data collected by the monitoring equipment will be recorded on a removable magnetic tape cassette while a locomotive is moving and under load. The data will be transmitted from strategic stops to a computer at SCL's Jacksonville base for analysis.

If the computer – an IBM 1800 data acquisition and control system – discovers a potential malfunction in a locomotive, it will print information on the repairs or maintenance needed. A mechanical crew will then be directed to service it.

Medical student responds to question posed by the computer while looking at a related slide.

Medical School Uses Computer-Assisted Instruction to Keep Doctors Up to Date

COLUMBUS, Ohio – A program of computer-based medical instruction has been initiated here to help keep physicians and other health professionals in rural and remote communities abreast of new developments in medicine.

The Ohio State University's College of Medicine is conducting the pilot education program under a grant from the U.S. Department of Health, Education, and Welfare.

The project, part of the Regional Medical Program, is an outgrowth of the college's research in the application of computers to medical education.

Dr. Lloyd Evans, assistant dean, said computer-based instruction for students has proven successful and should be equally useful in helping practicing physicians and other health professionals learn as their schedules permit.

"One of the traditional problems of medicine," Dr. Evans pointed out, "has been the time required to disseminate new medical developments and techniques to practicing physicians.

"This kind of system should do a great deal to relieve that problem."

Hospitals Participating

To initiate the program, computer terminals are being installed at four Ohio hospitals and linked via telephone lines to an IBM 360/40 at the college. The hospitals are Grant in Columbus; Marion General, Marion; Holzer, Gallipolis; and Licking County Memorial, Newark.

Once the doctors become familiar with computer-assisted instruction (CAI), they will be able to draw on a variety of programs, including retrieval of the latest information about the medications and treatments available for a particular disease. They may also take refresher courses in their area of specialty.

Drugs May Be Next

Dr. Evans explained that the latest drug developments may also be made available to doctors through the system.

The IBM 1050 terminal to be used in each hospital has a companion slide projector which permits health professionals to view color slides of such things as tissue, medical illustrations, or other material.

Individuals taking these courses will respond to a series of tutorial questions posed to them by the computer so that they may evaluate their own progress at learning the material presented.

The system rewards right answers with advanced material and tutors as necessary when the learner does not completely understand the subject matter. The system also may refer him to an outside source, such as a professional journal, for further background before proceeding.

Each participant proceeds at his own pace, and is guided to correct answers if necessary.

Other Courses

In addition to serving the educational needs of practicing physicians, the system will offer specific courses of instruction to nurses, physical therapists, dietitians, and other health professionals.

In the undergraduate medical and dental curricula at Ohio State, CAI tutorial programs are available on a voluntary basis. These include anatomy, histology (cell study), and physiological chemistry.

Currently, OSU's first year medical class and the second year dental students are using the system.

"Computer-assisted instruction is an extension of personal instruction, allowing students to learn at their own pace and at times of day when classroom instruction is not available," Dr. Evans said.

"We hope that the system will indicate that we can reduce the amount of time required to prepare a physician for the practice of medicine, and at the same time provide a flexibility which will allow the curriculum to adapt to individual needs.

"CAI is not viewed as the solution to all instruction problems, but rather, as a means of providing tutorial evaluation and instruction on certain critical points. CAI will serve to test and sharpen knowledge in a given subject area rather than become the primary instructional method."

Optical Character Reader Used by IBM To Speed Analysis of Installation Data

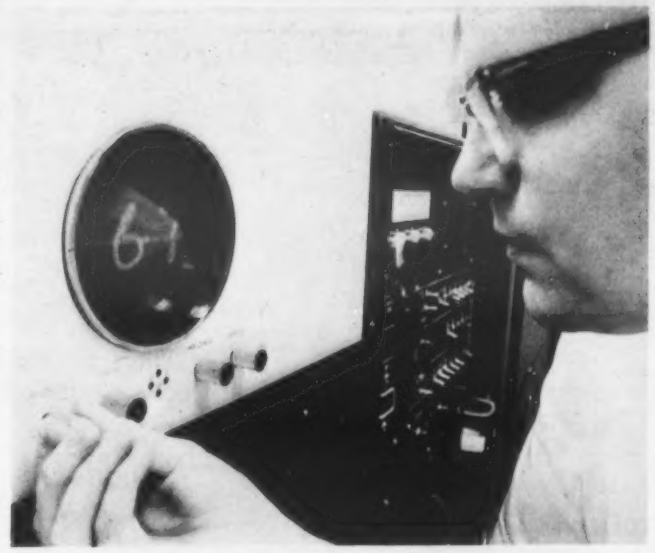
WHITE PLAINS, N.Y. – An optical reading device is being used to speed analysis of data on installed IBM information handling systems and equipment.

IBM customer engineers hand print on cards performance data they gather when servicing customer's equipment. The cards are read by an IBM 1287 optical reader, and the data is entered directly into a 360/30.

In the flying spot technique used by the 1287, a moving beam of light, generated by a cathode ray tube reads the reports by spiraling over hand-printed characters. The computer records the data on magnetic tape and transmits it over telephone lines to IBM's central processing installation at Mahwah, N.J. for further analysis.

This information forms the main data base for IBM's Field Engineering Division, which installs and services the company's information handling systems and equipment. It is used to analyze product performance, improve existing designs and future products, and to guide specialists in developing more efficient techniques for servicing equipment.

The new program went into effect last month in the division's western regions, which includes 12 states from Washington and California to Texas. By the end of summer it will be extended to include all of the United States, an IBM spokesman said.



Hand-printed characters being read by the IBM 1287 optical reader are displayed on the device's CRT.

School Adopts 'Checkless' Method Of Paying Its 130 Faculty Members

HERSHEY, Pa. – A step toward the widely discussed "checkless" society is planned by the Milton Hershey School.

The system will be implemented with the help of an NCR Century 100, scheduled for delivery to the school next winter.

Instead of receiving paychecks, the school's faculty of 130 instructors will receive only the computer-prepared statements normally appended to paychecks. Duplicate data will be forwarded to the Hershey National Bank, and the bank will credit the instructors' accounts with the proper amounts. If a payee should happen to be using another bank, the Hershey National Bank will supply the payee a check for him to present for deposit at another institution.

"The faculty's reaction to the checkless payroll idea has been extremely positive," said Clyde Ebersole, controller of the school attended by over 1,500 orphaned boys. He pointed out that the approach will eliminate the "reconciliation problem." This is caused by having many different checks going out to individuals and their being cashed at different times at the payees' discretion. Under the new system the entire payroll will go into the various accounts at once. Thus, the bank will be able to deduct from the school's account in an easily accountable amount, he said.

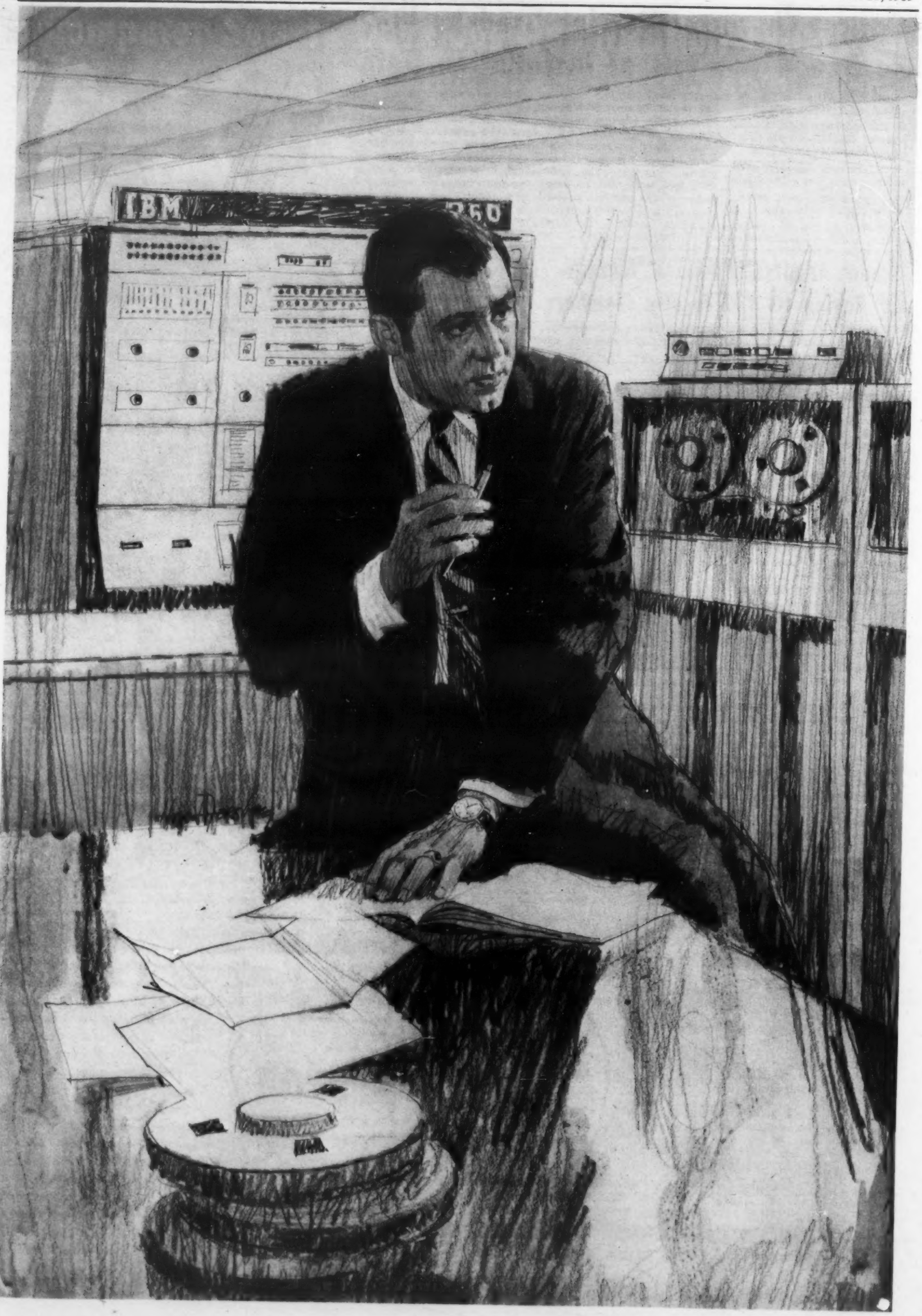
At some future date it is possible that the plan will be extended to include automatic home-mortgage and auto-loan deductions from individual employee accounts, he said.

Pension Checks System Planned

ROME – Beginning in September, the Italian Ministry of the Treasury will use large-scale optical reading equipment to process some 1.8 million pension fund checks issued monthly to retired government employees, their widows, or their children. Pension fund recipients cash their checks at 13,000 post offices throughout Italy, with the post office returning the documents daily to the treasury's Rome data center in batches of about 10,000 checks.

The system, an Electronic Retina Computing Reader, will be leased from Recognition Equipment Italia.

The ministry expects to realize a major savings through use of the optical reading system since it will be able to prepare the monthly pension checks on line printers for later optical reading.


IBM

Who's who in data processing?

Intelligent, imaginative executives. Professionals. Like talented Anthony J. Stoeckert, President and Board Chairman of expanding Diversified Data Services and Sciences Inc.

With eighteen years in data processing, Tony has chalked up an impressive record in management posts at IBM, and more recently as Vice President of a software firm. Last year, convinced that fresh approaches were needed, Tony and his associates established their own company. It is a full service corporation with high performance standards and a superior range of specialized capabilities.

Since people are the key element in any successful business, he surrounded himself with recognized professionals, and now has a staff of more than 75 serving an impressive list of clients. Among them are the Crum and Forster Insurance Group, Zurich Insurance, Crown Fabrics, almost a third of New York City's taxi fleets, Wells Fargo and Royal-Globe.

Located in new headquarters in mid-Manhattan, DDSS offers services in all major areas of Data Processing — including an on-site IBM System/360 for systems analysis, programming and time sales. Through subsidiaries, it also has capabilities in the fields of telephony and education; and more to come.

Why not find out how Diversified's growing, wide-ranging capabilities can contribute to more efficient operations for your company? Just send in the coupon below. Or call us.

FULL SERVICE . . . BY PROFESSIONALS . . . FOR PROFESSIONALS

dis DIVERSIFIED DATA SERVICES AND SCIENCES INC.

105 Madison Avenue, New York, New York 10016 • (212) 889-1800

Gentlemen: I want to know more about your organization's service and capabilities in —

- ☐ Systems Design
- ☐ Programming/Analysis
- ☐ Feasibility Studies
- ☐ Proprietary Programs
- ☐ Computer Time Sales
- ☐ Educational Services
- ☐ Data Entry
- ☐ EDP Personnel Recruitment
- ☐ Data Communications
- ☐ Facilities Management

NAME _____ TITLE _____

(Please attach this coupon to your letterhead)

Package Handles the Accounting For Time Deposit Certificates

MIAMI – Time certificate of deposit processing can now be computerized through the use of a system developed by Xiox International, Inc. (formerly International Computing Service) here for the S/360. The basic price is $6,000 and includes documentation.

The system is Cobol oriented, and incorporates the use of disk and/or tape on at least a 32K system of any model 30 or larger. The program is also available for the Burroughs 5500, in Cobol.

All versions offered include maintenance, complete documentation, and source material. Training is available on a time and materials basis.

Two versions of the program are offered. The $6,000 version is aimed at the bank which desires to do only its own processing. A service-bureau version is available for $7,500 per installation.

According to Mr. Borman, director of marketing for the company, 14 installations have been made to date, and several more are underway. One of the customers, he told *Computerworld*, made the alterations for the B5500, and this customer is currently offering complete support of the package through Xiox.

Several reports are produced by the system. In general it operates in two phases: update and report. The system calculates interest on a daily basis, compensating for short months, weekends, holidays, etc. Available reports include daily controls for certificates of deposit showing accrued interest, paid today, and outstanding amounts; listing of new certificates; daily interest to-be-paid; daily listing of matured certificates; and problem list (input errors, processing errors, etc.).

Several reference reports are produced on request for detail account history, deposits pledged against loans, weekly analysis by amount of certificate, and analysis by month of maturity.

Xiox is at 8101 Biscayne Blvd. here.

CERTIFICATES OF DEPOSITS PROBLEM LIST — PAGE NO 3

11/25/6-

CERTIFICATE NUMBER UNPOSTED	POSTED	REMARKS	NAME
003630		NO MATCHED MASTER	
003631		NO MATCHED MASTER	
	004797	INT PRT ADJUSTED TO AVOID OVERPMT	WILLIAM H. OR ROSE THORN ITF
	005002	NO S.S. NO.	MIAMI NAT-L. BANK ESCROW AGET.
	005132	NEEDS SAVINGS NO.	HELEN E. OR HARRY D. BARBER
	011455	NO S.S. NO	ROGER H. THOMPSON

NO. OF UNPOSTED ITEMS 35

Action report prepared by Xiox certificate of deposit system.

Service Offers 2,000 Programs

PITTSBURGH, Pa. – A remote batch computer service called Rits (remote input terminal system) gives businessmen, engineers, and scientists direct access to third-generation computers through local terminals. Located within the customer's plant or at a nearby Westinghouse Tele-Computer Service Center, these terminals can be used to develop new programs or execute previously written and retained programs.

All the compilations and calculations are carried out on an IBM 360/75 with input and output handled by an IBM 360/50. Data transmission between the two systems is done automatically.

According to Westinghouse, over 2,000 already written programs are available including: engineering methods analysis, systems modeling, environmental load analysis, optimization techniques, network studies, Camp services for N/C tool programming, and many others. Westinghouse Information Systems Laboratory is located here at 2040 Ardmore Blvd.

NC Tapes Produced via Remote Service

BALA-CYNWYD, Pa. – A time-sharing system for numerical control is available that provides users with terminals and keyboards on their premises to facilitate the control required by production automation.

Called Adapt Plus, the system was developed by Computer Sharing, Inc. It produces EIA (standard) coded tapes which can be used to directly control numerically programmed machines in the shop. The system has an intermediate storage capacity of 2 million characters, providing large program capacity and great flexibility, the company claims. System diagnostics are on-line, and the editing capabilities provide a high degree of flexibility, a company spokesman said. Adapt Plus provides description capabilities including three-dimensional contour maps with either flat or tilted planes. The programs can permit the definition of points, lines, and curves directly from the blueprint.

To aid users in developing time-shared uses of numerically controlled equipment, the company explained, CSI is holding seminars and training sessions on-site, and special workshop sessions dealing with practical problems in the NC environment.

GPSS Added to Bureau's Library

PORTLAND, Ore. – EDP Central now offers the IBM General Purpose Simulation System (GPSS) to its time-sharing subscribers.

This simulator is used for better determination of the relative importance of different factors in any continuing process or environment. E.D. Poole, company vice-president, said that, "GPSS is a set of related programs used to simulate the operations or 'flow' of activities processes and systems of almost any kind of business or manufacturing facility."

He explained that, "In the span of a few hours or even minutes, a computer can 'copy' years in the daily life of a business or industry, analyze the conditions that make it run, and 'report' back to management on the results of its work."

GPSS is available from any of the company's sites in Oregon, Washington, and Idaho, Poole said. The company is based here at 1006 S.E. Grand Ave.

Keno ticket writer uses a Kenotronic terminal as William G. Bennett (left), president and general manager of the Mint Casino, and Joseph A. Ricca, president of Ricca Data Systems, watch.

'Please Input Your Bets,' Is Newest Gambling Call

LAS VEGAS – Gambling will be easier with a new computerized accounting system for Keno, a number game played in some casinos here.

Kenotronic was developed to the specifications of a casino, The Mint, by Ricca Data Systems of Santa Ana, Calif. It is the first phase of a complete operating system Ricca hopes to have installed at The Mint by the end of this year.

Keno, a game of ancient Chinese origin, allows a player to select up to fifteen numbers out of eighty possible and place a wager, usually from 60 cents to $6. The house draws, at random, 20 numbered balls of ping-pong size from a rotating fishbowl. A player can, against huge odds, win as much as $25,000 on a single wager.

The system automatically reads in coded Keno tickets by means of a fiber-optics reader and stores the data on disk. When all tickets have been processed, and the random numbers selected, the computer prints out the numbers of the winning tickets with their individual winnings, total amounts paid out, and the gross receipts of the game.

William G. Bennett, vice-president and general manager of The Mint, explained that the RDS Kenotronic system eliminates the inherent problems of hand-written tickets, decreases waiting time between games, and facilitates remote play. Bennett added that the RDS total system concept was developed with management, player, and ticket writer in mind, and should make Keno more attractive to all patrons of The Mint.

The system consists of the required number of ticket-writer terminals, and a multiplexor, plus a central computer-driven information storage and retrieval system complete with all related software. Each terminal includes a keyboard, a unique fiber-optics reader, and a printer.

In operation, the player marks his ticket with his number selection. He presents this ticket to the ticket writer who collects his money, inserts the ticket into the automatic reader, and enters the amount into the terminal. The terminal retains the customer ticket and prints out a receipted copy. After the last ticket is accepted, the randomly selected 20 numbers are displayed and entered into the computer. The computer then scans all tickets entered for that game, identifies the winners, calculates amounts won, and performs other accounting functions.

A winning patron presents his ticket to any ticket writer, who enters the serial number into the terminal. The terminal then prints out a duplicate copy of the original ticket so that the presented ticket can be verified.

Coursewriter Available for DOS/360

WHITE PLAINS, N.Y. – Coursewriter, IBM's programming system for educational materials and course planning, has now been expanded to operate under the S/360 in DOS (disk operating system).

Previously available only for the 1400 and 1500 systems, Coursewriter permits educators and training specialists to enter organized course material into the computer through terminals. The language is English-oriented, and aimed at the presentation of the material through other terminals, enabling the teacher to refine the material and presentation based on response from others on a direct basis, according to the company.

The program requires a minimum of 64K of memory and operates on any Model 30 or higher.

Language Designed to Handle Typesetting Applications

PRINCETON, N.J. – A new language, Ultra-X, for the printing and typesetting industry has been announced by Printing Industry Computer Associates, Inc. It is intended, according to the company, to have as broad a use in the printing industry as Cobol does in the commercial programming industry.

The system and compiler operate on the S/360 and use simple format statements to describe typeface changes. Ultra-X converts these statements into preprogrammed routines for instructing the computer. Pages can, according to the company, be programmed with only 10% of the instructions required with previously available languages. The language also incorporates logical descriptions for page formatting which automatically build the desired formats.

The language is based on the philosophy developed by Dr. Michael Bernett while at MIT and is aimed at the problem of simplifying communications between the user and the system. A manuscript copy editor who is not a programmer can learn to use the language in very little time, the company claims. The language is structured around 84 two-character words, which in themselves are simple. For example, BB signifies the bottom boundary of a page; PS, the point size; and TF, the type face.

Designed to operate with visual displays, Ultra-X can also be used with linecasting equipment and phototypesetting devices, the company pointed out.

Operating under DOS, the system can be run under multiprogramming. The system enables the operator to produce final page proofs directly, rather than produce an intermediate galley proof. This will eliminate much of the work associated with such work.

The package is already installed at Arcata National Corp. in San Francisco and several other installations are due soon. The company's offices are located here at 228 Alexander St.

Firm Offering 'Debugged' 1108 Software

REDONDO BEACH, Calif. – Software for the Univac 1108 is now available from Athena Programming.

President of the new company is Dr. Jack Perrine, one of the designers of the 1108 Fortran compiler.

The company is offering a specialized service known as Cooperative Consulting Service (CSS). The plan permits any subscriber to obtain, as part of the subscription fee, corrections for Fortran and Exec II (one of the 1108's operating systems) bugs discovered at his own or other sites.

Subscribers also receive current corrections and discounts on specific requested system enhancements. The company also conducts a series of tutorial seminars in the use of Exec II and the Fortran compiler. Athena is based here at 1161 S. Pacific Coast Highway.

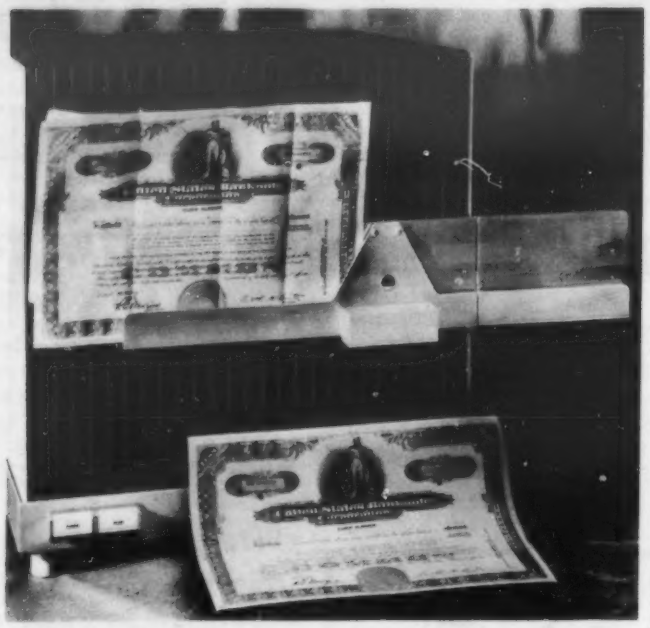
Data Check Developer Moves to New Office

NEW YORK – Express Software Systems, Inc., developer of Data Check Express [CW, June 11], has moved from 500 Fifth Ave. to 342 Madison Ave., the firm announced last week. Data Check Express, a system that checks, corrects, updates, and merges data, can be learned in two hours by an inexperienced programmer, the company said.

Payroll Service Offered On Time-Sharing Basis

PHOENIX, Ariz. – Payroll processing is now offered on a time-shared basis by Information Networks Corp., a subsidiary of Wabash Magnetics Corp. The program is available through the company's time-sharing system, and is English oriented for management.

The system handles, according to INC, all the normal requirements of payroll systems, but uses the on-line mode of processing to speed up the delay-time in personnel management.



CDC's optical scanner reads specially printed codes on the edge of the stock certificate.

OCR Methods Can Salvage Old Stock Certificate

NEW YORK – A strong plea to save the big, old stock certificate and forget the small, newly proposed punched card certificate was made recently by Fred R. Esty, chairman of the U.S. Banknote Corp.

Esty announced that U.S. Banknote and Control Data Corp. have jointly developed a new system of marking the large 8 in. by 12 in. certificate that makes the certificate machine-readable on an optical character reader engineered by Control Data.

Esty stressed the following reasons for maintaining the old certificate:

- It would retain the current level of proven security.
- The transition to the new machine-readable big certificate would not require re-engravings.
- The retention of this size would safeguard the industry against a chaotic transition that could result from using two different-size certificates.
- The big certificate is much less susceptible to rapid concealment and easy theft.
- The big certificate is processable with attachments.

A spokesman for Control Data said that the remote terminal reader has not been priced by CDC yet, but the price would probably be in the $3,000 to $5,000 range through U.S. Banknote.

The speed of the reader is about 15 characters per second and it presently operates through a tie-in to a paper punch for separate coding at a later time.

The unit is not yet in production, and, depending on total order quantities, could be ready for delivery in about a year, CDC said.

150 Members Indicate Acceptance Of NYSE Block Automation System

NEW YORK – The New York Stock Exchange has demonstrated its Block Automation System and announced that more than 150 member brokerage firms and institutions already have indicated they will be part of the system's network when it begins operation around the turn of the year.

The Block Automation System uses a computer to match the buy and sell interests for blocks of stock, a matching process now done largely by thousands of telephone calls a day between brokers.

NYSE President Robert W. Haack, in a statement issued in connection with the demonstration, said the NYSE expects to start its computerized matching network with some 200 subscribers. Mutual funds, banks, pension funds, and insurance companies, as well as brokerage firms, are among the organizations that have signed Letters of Intent since April 30 of this year.

The NYSE last month [CW, June 4] signed a contract with Bunker-Ramo Corp., under which Bunker-Ramo will manufacture, install, and service some $2 million in terminal equipment for the offices of subscribers to the system. First units are scheduled to be installed in September.

"One entry in the system," said Haack, "will be the equivalent of many telephone calls. By having the matching process going on continuously in a computer, brokers will be able to concentrate on the actual negotiation and execution of block trades."

Financial View From Abroad

U.S. Software Firms Are Latest To Invade European EDP Market

By Nancy S. Foy
Special to Computerworld

Hugh Moore, president of Computer Equipment Corp., recently told a WEMA meeting in California that Europe may be the best source of capital for U.S. expansion of smaller technical firms. He suggested that firms with turnover in the $10-million-up range, especially those with European affiliations, ought to be exploring Eurodollar financing.

Perhaps this consideration, combined with the availability of highly skilled programmers at considerably lower salaries, has given impetus to a new "software invasion" of Great Britain.

Xenophobia Strikes

Early this year the UK press voiced considerable alarm about the invasion of the British software field by a number of acquisition-minded firms, notably leasing companies looking for diversification and European footholds in the face of an uncertain IBM situation.

In late 1968 Leasco acquired Inbucon Ltd., a leading systems/software firm, and began creating a group of its own as well, under the Leasco Systems and Research banner.

At the beginning of the year, Granite Leasing made a $7 million offer for Management Dynamics Ltd., a fast-growing software/service subsidiary of Brooke Bond Liebeg, a UK food company. This focused press attention on takeovers, and interest was intensified when Greyhound Computer streaked in under Granite's more-ponderous nose and snatched Management Dynamics away with a $6.5 million cash offer, in Eurodollars. Other leasing companies more quietly established their own outposts and the uproar subsided after a few weeks.

U.S. Firms Invade

The latest "wave" – penetration by U.S. software companies – is not so much a new phenomenon as an intensification of an old one, but both invasions have encouraged a number of enterprising UK entrepreneurs to leave more secure nests and start up software houses with sufficient fanfare to attract notice from acquisition-minded visitors. Meanwhile, advertisements for programmers, formerly in the £1,800-£2,500 range, now flaunt figures as high as £3,500 ($8,400), with management and software sales ads in the Sunday papers running up to £4,500 ($10,800).

The "buy-British" tendency is strong and several firms have shown an awareness of this. Brandon Computer Services Ltd., which has had a London outpost for four years, flew Dick Brandon in for the late-May announcement that they had transferred Bob London, a U.S. vice-president, back to the States, replacing him with Roger Graham, a British veteran of the Management Dynamics group, with other locals taking over key posts in the organization as marketing for the new Resource Management System (plus some acquisition-hunting) gets under way.

On June 4 Leasco announced that its Systems and Research group was being merged back under the Inbucon label, certainly a move to re-establish the firm's British image before the next wave of Yankee-go-home criticism appears in the UK trade press.

More Software Firms

Meanwhile software firms continue to arrive, place their ads for individual programmers or enter their negotiations with local software houses. In April PRC acquired a minority interest in Logica Ltd., a new firm started by several key men from SciCon (formerly CEIR and now a totally-British subsidiary of British Petroleum). CSC, which has had a shaky foothold in London for several years, lost some key people to the entrepreneurial instinct recently, and now concentrates its efforts in Brussels, though the firm continues to loom in competitions for major government contracts.

Cybernetics International Corp., fresh from a successful public offering in the U.S., has opened a UK subsidiary in conjunction with Bankers' Trust Company, and is noisily headhunting in London. Quieter visits were the mode for firms like Applied Computer Technology and Programming Sciences (which just formed Programming Sciences Ltd.).

And Next

The next "wave" is likely to be in the real-time service area. Already the majority of time-sharing and remote-batch services in London have U.S. origins, though two new all-British services (based on SDS Sigma 5 computers) will begin time-sharing this summer in London. Time-Sharing Ltd., a time-sharing pioneer, is a Bolt, Beranek & Newman affiliate; ITT Data Services, UCC, and GE have outposts here; and IBM and Honeywell will be offering services in a time-sharing mode from existing bureaus, while a number of U.S. time-sharing independents are beginning to make quick visits to find new homes for old computers that are still economically viable in the less technically demanding European environment.

RCA Buys Four Packages To Distribute to Users

ATLANTA – Management Science America, Inc. has announced the completion of contract negotiations with RCA Information Systems Division for the purchase of four bank application software packages.

Terms of the contract grant RCA the right to use, modify, and distribute these software packages for three years. Completion of delivery will be made by August of this year, according to Robert P. Jones, senior vice-president of MSA.

Software packages purchased by RCA were: Corporate Trust, which provides management information on all stockholder record activity on a daily and/or monthly basis; Time Deposit Accounting, which facilitates management decisions with timely information reporting and handles passbook or statement savings, special open accounts, certificates of deposit, and Christmas Club accounts; Installment Loan Accounting, which provides daily or weekly processing and offers a choice of interest methods for any bank on the system; and Commercial Loan Acocunting, which handles demand term and time loans either on a discount or add-on basis and provides comprehensive management reporting with optional selections.

A spokesman for RCA said that the four packages will be added to the line of packages already available to all banks purchasing the Spectra 35 and up computer systems.

Hazeltine Corp. Declares 25% Stock Dividend

LITTLE NECK, N.Y. – The board of directors of Hazeltine Corp. has declared a 25% stock dividend on its common stock payable July 21, 1969, to stockholders of record on June 10, 1969, and has ordered $7,838,320 transferred from retained earnings account to the common stock account.

This represents the approximate market value on May 21 of the common stock to be issued.

Fractional shares of common stock will not be issued.

UCC Changes Gulf Group To UCC Financial Corp.

DALLAS – University Computing Co. has changed the name of its wholly owned financial subsidiary from Gulf Group, Inc. to UCC Financial Corp.

August R. Buchel, president of UCC Financial Corp., reported that the new name is "more consistent with the additional role the financial company anticipates, as an investor in UCC computer enterprises or other high-technology companies in fields of interest to UCC."

Sag Perhaps an Understatement As Stock Market Plummets Again

By A.B. Williams
And P.L. Briggs
CW Staff Writers

CW's Leasing sector led the market sag with a drop of 10.5% to 78.71 for the week ended June 13. Overall, losses exceeded gains by about 11 to one. Eight stocks rose, while 92 slipped.

Supplies and Accessories was the least-hit member of the list, with a loss of only 2.9% to 117.30. System Capital Corp. led the leasing sag with a loss of 22% (down 3-1/2 points to 12-1/2). This loss was followed rather closely by an 18% drop in Cyber-Tronics, down to 8 from its high of 12-1/2 earlier this spring. Systems was down 5.6%, Peripherals was off 7.7%, and Software fell 7.9% to 141.65, its lowest reading in over a year.

Many new issues are feeling the pinch about this time. Telefile Computer Corp., a company with many points to recommend it under reasonably normal market conditions, had a certain amount of trouble making its offering, a market source told *Computerworld*.

Many stocks hit new lows during the week, 33 in all. Only 3, among them Computer Sciences, hit new highs for the year. CSC did manage to close down 3-1/4 points for the week, but it bucked the trend for quite awhile.

What's Wrong?

Everything being said and written in the money industry seems to point to the drop in available liquid capital. The perennial bloom is off the perennial rose, at last. New offerings are still hitting the market at a brisk pace, but in general, they are not being snapped up quite as readily as they were a few weeks ago. No giant immediate profits are popping up. It seems to require more than just a flashy name (Computer—) to bring in the big money overnight, much more so than we have become accustomed to in recent years.

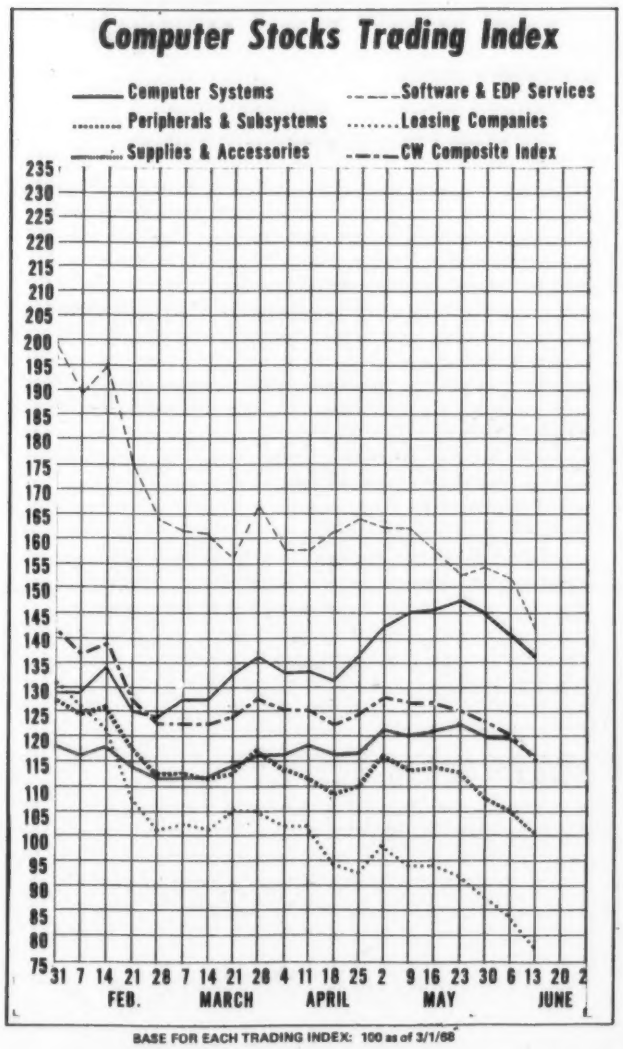
Cash, itself, is certainly more expensive. Interest rates continue to spiral with no signs of tapering off. Money is still available; however, it requires more work to get it. Industry projections have suffered, and probably are still suffering, from a form of hyperconservatism, boding good results for the investor who thinks his way carefully through the complications of prospectuses with disclaimers which are almost beyond belief.

Too Much of a Good Thing

Does that sound strange? Look at the exponential rise in the use of alphabet soup for company names. It has become so prevalent that many companies do not really have a name, only a set on initials with an esoteric meaning. Ulcers, no doubt, result partly from the lack of spelling ability among the more intelligent.

There still are a few concrete items from which to work, such as earnings reports, although these do seem to suffer excessively from interpretation; P/L statements, equally open to question; and much "professional" advice from people who are suffering from the same problems as the guy with a few bucks.

In the end, the only significant factor is earnings or profits, but given current practices, it's increasingly difficult to identify these when they appear in print.



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

COMPUTER STOCKS: TRADING SUMMARY

WEEK ENDED JUNE 13, 1969

COMPUTER SYSTEMS

EXCH	1969 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK % CHANGE
N	135-120	125 1/4	BURROUGHS CORP	+ 1	.80
N	69- 47	47 1/4	COLLINS RADIO	- 6 1/2	-12.89
N	159-125	140 1/4	CONTROL DATA CORP	- 8 3/8	-5.63
A	201-138	189	DIGITAL EQUIPMENT	- 9	-4.55
N	25- 18	18 3/8	ELECTRONIC ASSOC.	- 2 1/2	-11.98
N	98- 85	91 1/2	GENERAL ELECTRIC	- 2 3/4	-2.92
N	95- 75	87 5/8	HEWLETT-PACKARD CO	- 3 3/4	-4.10
N	148-107	129	HONEYWELL INC	- 5 1/2	-4.09
N	334-291	311 1/2	IBM	- 7 1/2	-2.35
N	139-108	125	NCR	- 5	-3.85
N	48- 41	43 5/8	RCA	- 3/8	-.85
N	58- 33	33 3/4	RAYTHEON CO	- 4 1/8	-10.89
O	43- 24	30 1/2	SCI. CONTROL CORP.	- 1	-3.17
N	55- 44	49 1/2	SPERRY RAND	- 2 5/8	-5.04
A	36- 26	30 3/8	SYSTEMS ENG. LABS	- 4 7/8	-13.83

PERIPHERALS & SUBSYSTEMS

EXCH	1969 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK % CHANGE
N	82- 65	78 3/4	ADDRESSOGRAPH-MULT	- 8 1/2	-10.73
O	71- 24	26 1/4	ALPHANUMERIC	+ 1 1/4	5.00
N	44- 32	41 3/4	AMPEX CORP	- 1/8	-.30
O	19- 13	13 3/4	BOLT,BERANEK & NEW	- 1 1/4	-8.33
N	17- 11	11 7/8	BUNKER-RAMO	- 1 1/8	-8.65
A	37- 27	30 5/8	CALCOMP	- 1 1/4	-3.92
O	38- 23	28 1/2	COGNITRONICS	- 3	-9.52
O	16- 11	13	COMPUTER EQUIPMENT	- 1/4	-1.89
A	27- 14	15	DATA PRODUCTS CORP	- 2	-11.76
O	22- 13	13 3/4	DIGITRONICS	- 1 3/4	-11.29
O	62- 46	51 1/2	ELECTRON MEMORIES	- 3 1/2	-6.36
O	12- 9	9 3/8	FABRI-TEK	- 1 3/8	-12.79
O	37- 22	22 3/4	FARRINGTON MFG	- 5 3/4	-20.18
O	21- 14	14 1/2	INFORMATION DIS	- 3 1/2	-19.44
A	34- 20	25 3/4	MILGO ELECTRONICS	+ 1 1/2	6.19
A	82- 59	76 1/4	MOHAWK DATA SCI.	+ 1/2	.66
O	118- 54	54	OPTICAL SCANNING	- 4	-6.90
O	29- 20	20 1/2	PHOTON	- 3	-12.77
A	35- 27	29 1/4	POTTER INSTRUMENT	- 2	-6.40
O	76- 54	57	RECOGNITION EQUIP	- 6	-9.52
A	22- 18	20 1/4	RIXON ELECTRONICS	- 1 1/2	-6.90
N	61- 32	33 3/8	SANDERS ASSOCIATES	- 3 3/4	-10.10
O	85- 50	50	SCAN DATA	- 7	-12.28
O	36- 21	21	TALLY CORP.	- 3	-12.50
N	275-241	260	XEROX CORP	- 14 1/2	-5.28

SUPPLIES & ACCESSORIES

EXCH	1969 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK % CHANGE
O	47- 32	38 1/2	ACME VISIBLE	- 1/2	-1.28
N	22- 15	15 3/8	ADAMS-MILLIS CORP	- 2 7/8	-15.75
O	27- 23	25 1/2	BALTIMORE BUS FORM	- 3/4	-2.86
A	29- 18	21 1/4	BARRY WRIGHT	- 1/2	-2.30
O	44- 34	35	DATA DOCUMENTS	- 1/4	-.71
N	42- 36	37	ENNIS BUS. FORMS	- 1 3/8	-3.58
N	89- 65	82 5/8	MEMOREX	- 3 3/8	-3.92
N	112- 94	103 1/2	3M COMPANY	- 3 3/4	-3.50
O	37- 29	31 7/8	MOORE BUS FORMS	- 3 1/4	-9.25
N	46- 36	40	NASHUA CORP.	- 2 1/4	-5.33
O	48- 36	38	REYNOLDS & REYNOLD	- 1/2	-1.30
O	31- 23	29 1/2	STANDARD REGISTER	- 1/4	-.84
N	36- 28	34	UARCO	+ 1 1/2	4.62
A	28- 14	14 5/8	WABASH MAGNETICS	- 2	-12.03
O	34- 29	31 3/4	WALLACE BUS FORMS	- 1/2	-1.55

SOFTWARE & EDP SERVICES

EXCH	1969 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK % CHANGE
O	14- 7	7 1/4	ADVANCED COMP TECH	- 1 1/2	-17.14
O	39- 31	36	APPLIED DATA RES	- 3 1/2	-8.86
O	19- 7	8 1/2	ARIES	- 1 1/4	-12.82
A	83- 63	74 3/4	AUTOMATIC DATA PRC	- 7 1/8	-8.70
O	13- 7	8 1/4	AUTO SCIENCES	- 1/4	-2.94
O	17- 10	11	BRANDON APPL SYS	- 3/4	-6.38
A	21- 14	14 1/2	COMPUTER APPL	- 1	-6.45
O	16- 8	8 1/2	COMPUTER ENVIRON	- 1	-10.53
O	47- 30	30	COMPUTER NETWORK	---	----
N	75- 49	63 1/4	COMPUTER SCIENCES	- 3 1/4	-4.89
O	48- 17	17	COMPUTER USAGE	- 7	-29.17
A	56- 37	45 5/8	COMPUTING & SOFT	- 5 3/8	-10.54
O	24- 11	11 1/4	DATAMATION SERVICE	- 2 3/4	-19.64
O	17- 8	8 3/4	DATATAB	- 2 3/4	-23.91
O	15- 7	7 1/2	DIGITEX	+ 1/4	3.45
A	38- 28	25 1/8	ELECT COMP PROG	+ 2 7/8	12.92
O	38- 28	26 1/2	INFORMATICS	- 2 1/2	-8.62
O	19- 5	5 1/2	MATRIX CORP.	+ 1/2	10.00
O	22- 9	9 1/2	NAT COMP ANALYSTS	- 1/2	-5.00
A	33- 23	28 1/4	PLANNING RESEARCH	- 2 1/8	-7.00
O A	11- 8	8	PROGRAMMING & SYS	---	----
O	18- 6	7 1/4	SOFTWARE SYSTEMS	- 1	-12.12
O A	37- 8	8 1/2	STRATEGIC SYS	- 4 1/2	-34.62
O	36- 11	25 1/2	TBS COMP CENT INC.	- 4 1/2	-15.00
O A	12- 6	7	UNITED DATA CENTER	- 3/4	-9.68
O	155- 68	68	UNIVERSITY COMP	- 4	-5.56
O A	38- 29	29 1/2	URS SYSTEMS	- 1/2	-1.67
O A	16- 12	12	U.S. TIME-SHARING	- 1/2	-4.00

LEASING COMPANIES

EXCH	1969 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK % CHANGE
O	45- 34	35	BOOTHE COMPUTER	+ 3/4	2.19
O	18- 9	10	COMPUTER EXCHANGE	- 2	-16.67
A	34- 13	14 1/4	COMPUTER LEASING	- 1 5/8	-10.24
O A	14- 8	13 3/8	CONT COMPUTER	+ 1/8	.94
O	12- 8	8	CYBER-TRONICS	- 1 3/4	-17.95
A	68- 31	35 1/4	DATA PROC. F & G	- 4 3/4	-11.88
O	16- 7	8 1/4	DATRONIC RENTAL	- 1/4	-2.94
A	52- 36	40 1/4	DEARBORN COMPUTER	- 1 1/4	-3.01
O	16- 10	11 3/8	DPA, INC.	- 5/8	-5.21
A	45- 26	28 1/2	GRANITE EQUIPMENT	- 3 7/8	-11.97
A	28- 16	16 3/4	GREYHOUND COMPUTER	- 2 1/2	-12.99
N	139- 33	33 3/8	LEASCO DATA PROC.	- 3 1/4	-8.87
O	9- 6	6	LECTRO COMP LEAS	- 1/2	-7.69
A	57- 32	32 1/2	LEVIN-TOWNSEND CMP	- 4 1/8	-11.26
O	8- 4	5 1/2	LMC DATA, INC.	- 1/4	-4.35
O	14- 6	6 1/2	MANAGEMENT ASSIST	- 1 1/8	-14.75
A	39- 28	32 3/4	NATIONAL EQUIPMENT	- 1 3/4	-5.07
O A	12- 6	6 1/4	NCC LEASING	- 1	-13.79
A	43- 22	24 1/4	RANDOLPH COMPUTER	- 2 5/8	-9.77
O	34- 12	12 1/2	SYSTEM CAPITAL	- 3 1/2	-21.88
A	28- 18	18 1/2	U.S. LEASING	- 1 1/4	-6.33

New Registrations

REALDATA CORP., 935 Hamilton St., Somerset, N.J. 08873, a company providing professional services and systems to users and prospective users of computers, filed to register 330,000 shares of common stock.

Proceeds, at $3 per share, intended for the development and marketing of the company's proposed turn-key information systems for the construction and trucking industries and municipal and school governments, and for the development and marketing of proprietary systems and consulting services in the areas of management consulting and industrial real estate services. The underwriter is Charles Plohn & Co., 200 Park Ave., New York, N.Y.

AYDIN CORP., Fort Washington, Pa. 19034, a company engaged in the acquisition and operation of technologically oriented and related businesses, primarily engaged in the design, manufacture, and sale of standard and specialized electronic products and systems for ultimate use in the aerospace and data communications fields, filed to register 300,000 shares of common stock. Of these, 150,000 are to be offered for public sale by the company and 150,000, being outstanding shares, by the present holders.

Proceeds, at $19.50 per share maximum, intended to repay bank indebtedness assumed in the acquisition of Hydranamic Systems Corp., bank indebtedness incurred upon such acquisition, bank indebtedness incurred in the acquisition of Raytor Corp., bank indebtedness for working capital loans to subsidiaries, and to repay various equipment notes. The underwriters are New York Securities Co., One Whitehall St., 5 Hanover Square, and C.B. Richard, Ellis & Co., both of New York.

DIAL-DATA, INC., 429 Watertown St., Newton, Mass. 02158, a company engaged in providing time-sharing services, filed to register 300,000 shares of common stock.

Proceeds, at $10 per share, intended for payment of notes issued to meet capital needs, for financial expansion, for payment of past-due computer rentals owed to SDS, for expansion of computer centers, for payment of past-due security deposits under three computer leases with SDS, and for establishing additional regional sales offices. The underwriter is Suplee, Mosley, Close & Kerner, Inc., 1500 Walnut St., Philadelphia, Pa.

TEXT COMMUNICATIONS CORP., 6 E. 45th St., New York, N.Y. 10017, a company engaged in providing a work-processing service, under the name "TextCom," filed to register 100,000 shares of common stock.

Proceeds, at $7.50 per share, intended for the design, development, and purchase of equipment, and for promotional and developmental expenses incurred in connection with the company's franchise program. The underwriter is Culverwell & Co., Inc., 1341 Main St., Springfield, Mass.

TERMINAL EQUIPMENT CORP., 750 Hamburg Tnpk., Pompton Lakes, N.J. 07442, a company planning to enter into the information processing field through its exclusive license to develop, manufacture, and sell the essential components of a data communications system now being developed, filed to register 100,000 shares of common stock. Proceeds, at $10 per share, intended for development and research. The underwriter is Milton D. Blauner & Co., Inc., 115 Broadway, New York, N.Y. 10006.

COMPUCOMP CORP., 421 Hudson St., New York, N.Y. 10014, a company engaged in the application of computer technology to the printing industry, filed to register 200,000 shares of common stock. Proceeds, at $8 per share maximum, intended for the development and operation of a specially designed computer system and the acquisition of related software, for the cost of salaries and training of up to 20 keyboarding personnel, for payment of salaries of four programmers and training costs, for rental of 20 keyboarding machines, for rental of additional premises for computer composition operating facilities, and for the purchase of additional type fonts for the computer photo-composition equipment. The underwriter is Baerwald & DeBoer, 70 Wall St., New York, N.Y.

CORPORATION FOR INFORMATION SYSTEMS RESEARCH & DEVELOPMENT, 401 N. Harvard Ave., Claremont, Calif. 91711, a company that intends to provide a variety of professional consulting services with emphasis upon the use of digital computers in performing research, systems, and product planning, and simulation and product development and implementation, filed to register 330,000 shares of common stock. Proceeds, at $3 per share, intended to repay indebtedness, to implement a remote inquiry time-sharing system, to finance proprietary program development for a year, and to finance simulation and product planning of commercial and military computing systems including peripheral equipment, The underwriter is Charles Plohn & Co., 200 Park Ave., New York, N.Y.

Programs Aimed at Helping Farmers

DES MOINES, Iowa – A firm with long experience in using EDP internally has set up Pioneer Data Systems, Inc. to offer software packages to both agriculture and business.

The new corporation is a wholly owned subsidiary of Pioneer Hi-Bred Corn Co., a large breeder and producer of hybrid seeds and poultry.

The parent company has been using EDP in its research program since 1950, and expanded its use of computers into marketing functions in 1962.

President of Pioneer Data Systems is Dr. Larry Baker, who joined Pioneer in 1960 after completing his doctorate at the University of Minnesota. The parent company will continue its internal computer department as a separate operation.

According to Baker, the new company will specialize in two areas: basic software packages that can be adapted to a wide variety of businesses, and agribusiness programs.

The parent company's experience in using EDP to solve agricultural problems gives it a definite advantage, Baker believes.

Most of the present computer programs offered to farmers merely mechanize bookkeeping, says Baker. In contrast, Pioneer's program will gather records so that they can be used for planning purposes.

"With our program, a farmer can predict the effects on income of shifting from one crop to another, of increasing crops while reducing livestock, or of going into a heavy livestock program," Baker pointed out.

"He can decide if obtaining additional capital will increase his income, or whether hiring more labor will result in more or less profit," he added.

New Companies

Tri-Comp Will Help Government and Banks

MIAMI – Organization of Tri-Comp Corp., a computer company that will specialize in total data processing support systems for governmental agencies and the banking industry has been announced.

President of the new corporation, which will be headquartered in the Miami National Bank Bldg., 8101 Biscayne Blvd., is George Gorgol.

Gorgol achieved national recognition in the computer industry as director of the City of Chicago's data processing operations.

He also will continue as president of XiOX International, Inc., a Miami-based computing service firm.

The new corporation was formed, Gorgol said, to fill an urgent need in data processing support systems for specific activities, initially concentrated in the governmental and banking fields.

The organization is based on the concept that a majority of agencies cannot feasibly or economically acquire data processing as an internal function, or even as a joint function within a group of agencies.

Tri-Comp Corp. will develop complete and pretested systems in both areas to provide complete and central operating facilities. These will operate through terminal equipment located in the user's facilities with internal staffs trained by Tri-Comp technicians, the company says.

Western Union Joins To Form Computer Firm

NEW YORK – Western Union Telegraph Co., Inc. and Advanced Research Corp. of Washington, D.C., have formed the American Communications Corp.

Bernard Rider, formerly assistant vice-president of engineering for Western Union, Government Communications Systems Department, has been elected president.

The corporation's offices will be located at 1501 Wilson Blvd., Arlington, Va.

In announcing the new venture, Rider explained, "The new corporation was undertaken to pool certain unique skills and to provide research, development, and analysis of communications systems, initially for certain categories of federally funded studies, then later, in service and commercial contract areas."

ACQUISITIONS

Dialscan Systems, Inc., a New York developer of low-cost methods for using the ordinary telephone to question a central computer and receive answers by voice, has purchased **Hotel World Digest**, a two-year-old travel publication.

Computer Leasing Co., Washington, D.C., an equipment leasing and financing corporation, has terminated negotiations, by mutual agreement, to merge with **Computer Industries, Inc.** a manufacturer of computer peripheral equipment headquartered in Sherman Oaks, Calif. Both companies are subsidiaries of University Computing Co. of Dallas.

Data Management Services, Inc., a Philadelphia-based EDP service firm, has acquired **Visual Instruction Systems, Inc.** of New York, an organization that provides audio-visual training systems for industry. Terms of the acquisition involve stock and cash.

Brandon Applied Systems, Inc., of New York, has announced the closing of its acquisition of a controlling interest in **Business Intelligence Services, Ltd.** of London, England. The agreement has been ratified by the board of directors of both companies. Business Intelligence Services is a market research, consulting, and training firm doing business in the United Kingdom and on the Continent, operating in the areas of data processing, general management methods, and product research in basic industries.

Scientific Control Corp. of Carrollton, Texas, and **Multi-Circuits, Inc.** of Manchester, Conn., have agreed in principle to a plan through which Scientific Control would acquire Multi-Circuits for cash and SCC common stock. Scientific Control develops, manufactures, and markets sophisticated time-share and other computers and related equipment for the communications and data acquisition markets. Multi-Circuits, Inc. manufactures printed-circuit boards, principally for the computer industry.

Hackett Corp., a privately owned manufacturer of EDP punched cards and distributor of magnetic tape, disk packs, and other information media supplies for the data processing industry.

Knoxville Computer Center has announced the completion of its merger with **Commercial Data Processing Center**. The Knoxville Computer Center is part of a network of 19 computer centers. The centers are staffed and operated by MSA Computing Co., a division of Management Science America, Inc., an international firm specializing in management consulting, systems design and implementation, software development, and computer center management.

Tracor, Inc., a scientific research and electronic instrument company, has acquired, for stock, **Mel-Rain Corp.**, and its affiliates of Indianapolis, an international electronic components manufacturing company.

The managements of **Burndy Corp.** of Norwalk, Conn., and **Barnes Corp.** of Lansdowne, Pa., have reached an agreement in principle for the acquisition of Barnes by Burndy in exchange for Burndy Corp. stock. The form of the acquisition is to be determined, and the transaction is subject to the approval of the board of directors of both companies and of the stockholders of Barnes.

Wells Management Corp. of New York, a diversified firm supplying personnel, executive recruitment, and computer services to business and industry, has announced the acquisition of the New York broker-dealer, **Gold, Weisman & Frankel, Inc.** Terms of the acquisition call for Wells to acquire the brokerage firm for an initial payment of 125,000 Wells common shares plus a future earnings payout formula in stock.

Computer Environments Corp., a computer educational training firm, has acquired the **National Institute for Continuing Education** of Manchester, Conn., which operates a study improvement program for high school and college students.

Contracts

Air France has awarded Raytheon a $980,000 contract for additional digital information display systems to be used at Orly Field, Paris. Air France has ordered 81 television-like displays, called DIDS-400 (digital information display systems), and 72 special printers, which will comprise an automatic boarding system at the airfield. The system is designed to move passengers more efficiently through the air terminal and speed boarding operations on Air France aircraft.

Computer Applications Inc. of New York City has renewed its contract with Nasa for the continuation of technical support of the agency's Goddard Institute for Space Studies in New York. The 18-month, $2.5 million contract covers complete computing and related support services. In addition to providing basic mathematical analysis and computer programming support, Computer Applications is responsible for the operation of a major computer center, the creation of operating systems software for that center, electronic and mechnical research instrumentation, and technical library services.

Data Dynamics, Inc., Los Angeles, has received an $81,600 contract for its Stax (scientific tax assessing system) from Palm Beach County in Florida. The contract covers the first two phases of a four-phase, $340,000 program designed to analyze information requirements and implement a data processing system that will assist in county assessment of property.

The Department of the Army has awarded a $232,000 contract to Milgo Electronics Corp. of Miami, Fla., to furnish three Automatic Radar Control and Data Equipment Systems. The Milgo systems, known as Arcade, will be installed at the Army's White Sands Missile Range in New Mexico.

Design Technology has been retained to undertake mechanical engineering and industrial design of new products developed by Computer Products, Inc., a Fort Lauderdale-based electronics manufacturer.

Superior Motels, Inc. of Hollywood, Fla., has signed a contract subscribing to the automated reservations service of International Reservations Co., a computer-based reservations network for hotels, motels, auto rentals, travel agents, corporations, and airlines.

Digital Development Corp. has received a follow-on contract for production of DDC 73 memory subsystems from the Industrial Products Division of Texas Instruments for use in several of its systems. Headquartered in San Diego, Calif., DDC supplies rotating digital memory subsystems used in a variety of computer and industrial process system applications.

Cherokee Management and Computer Services, Inc., a subsidiary of Perfect Fit Industries, Inc., has accepted a contract from the Ma-leck Woodworking Corp. of North Carolina for complete computer programming services.

Orders and Installations

The Greek Atomic Energy Commission of Athens, the sole nuclear research facility in Greece, has contracted for two Control Data computer systems, a multiprogramming CDC model 3300 and a medium-scale CDC 1700 System. The Greek AEC, a member of CERN, the international research and development facility and data center in Switzerland, will use the CDC 1700 to format and edit source data, mainly in the area of high energy physics, for processing on the larger CDC 3300.

Three companies have ordered Honeywell Model 120 computer systems: Armstrong Brothers Tool Co. of Chicago, Chase Brass & Copper, Inc. of Shaker Heights, Ohio, and Victor Equipment Co. of Denton, Texas. All systems will be employed for general office purposes.

AMIC Co., a New York automation consulting firm and DP service, has received three data communication system units from Communitype Corp. of New York. Two Communitype 105 I/O terminals and one Communitype 550 send/receive magnetic tape conversion unit will be employed in automation programs specially designed for low-budgeted operations.

Installation is underway on a Univac computerized communications system at MacDill Air Force Base, Tampa, Fla. The system, featuring a Univac 418-11, will provide the U.S. Air Force and U.S. Strike Command with an automated entry into the government's Autodin network. In addition, the system will include a Fastrand mass storage drum, an FH330 Drum, and four Uniservo V1-C magnetic tape units.

Red Food Stores of Chattanooga, Tenn. will install an NCR Century 100 to process store orders and speed up the movement of merchandise from warehouse to customer.

General Electric's Lamp Metals and Components Department ordered a GE-405 information system for use in centralized general accounting, including payroll, billing, and also for manufacturing production and efficiency reports.

Mohr Made Bunker Ramo President; MacIntyre, Chairman

OAK BROOK, Ill. – Dr. Milton E. Mohr has been elected president and chief executive officer and Malcolm A. MacIntyre has been elected chairman of the board of the Bunker-Ramo Corp.

The restructuring of Bunker-Ramo's top management was announced by Mohr following the annual organizational meeting of the board of directors.

MacIntyre, a former undersecretary of the Air Force, has been a director of Bunker-Ramo since formation of the original company in 1964.

Mohr, who has served as chairman for the past year, will be the primary administrative and operating officer of Bunker-Ramo, as its president and chief executive officer. Mohr said the changes will enable him to devote more time to overall corporate operations and the efficient attainment of projected corporate goals.

William H. Rous, who had been president, had previously announced his resignation to devote more time to his public and personal interests.

Executive Corner

MacIntyre will continue to serve as president of the Chemical Division of Martin Marietta Corp., which owns a substantial stock interest in Bunker-Ramo.

Following his service as undersecretary of the Air Force from 1957 to 1959, MacIntyre was president of Eastern Airlines from 1959 to 1963. A native of Boston, MacIntyre is a graduate of Yale University and the Yale Law School, and was a Rhodes Scholar at Oxford University.

He practiced law in New York and Washington, D.C. prior to 1957, specializing in finance, tax, and labor matters.

MacIntyre is a Trustee of the Carnegie Corp., a member of the board of the White Plains Hospital, and recently completed a three-year term as mayor of Scarsdale, N.Y.

Boothe Announces Top Appointments of Officers

SAN FRANCISCO – Appointments to two top management positions at Boothe Computer Corp. have been announced by D.P. Boothe, Jr., chairman of the board.

Ronald F. Morrison has been appointed president of Boothe Resources International, Inc., a subsidiary of Boothe Computer, and Howard F. Vultee Jr. has been appointed to the position of vice-president of corporate development.

Morrison was formerly director of marketing for IBM in Latin America and, more recently, a vice-president with Marshall Industries.

He is an engineering graduate from the University of California and has an M.B.A. degree from the University of California Graduate School of Business.

Before joining Boothe Computer, Vultee was associated with Eastman Dillon, Union Securities & Co., New York. He is a graduate of Princeton University and the University of Geneva, Switzerland. He also holds an M.B.A. degree from New York University.

Renwick to Specialize As GT&E Data President

NEW YORK – John B. Renwick, who has been an officer of two subsidiaries of General Telephone & Electronics Corp. since late 1967, will now serve exclusively as president of GT&E Data Services Corp.

Because of the extremely rapid growth of GT&E Data Services, Renwick will relinquish his responsibilities as vice-president and controller of telephone operations of GT&E Service Corp. effective July 1, according to the company.

Renwick was elected vice-president and controller of telephone operations in 1966, and president of GT&E Data Services at the time of its establishment the following year. He was vice-president and controller of General Telephone of Florida prior to joining the Service Corp.

A native of Monroe, La., Renwick received a B.S. in commerce from Northwestern Louisiana State College and a certified public accountant certificate from the University of Illinois. He was associated with Theodore Gary and Co., which subsequently merged with GT&E, prior to joining General Telephone of Florida.

Two Added to CUC Board

GREENWICH, Conn. – Dr. Cuthbert C. Hurd, chairman of the board of Computer Usage Co., Inc. since 1962, has been named chief executive officer of the company and chairman of the executive and financial committee. He will devote full time to his position in Computer Usage Co. and will maintain his office at corporate headquarters in Greenwich, Conn.

James E. Starnes, formerly vice-president of operations for CUC, has been elected president and chief operating officer of the company. He has also been named to the board of directors.

Charles Benton Jr., who has been serving as president and chief executive officer of CUC since July, 1968, has resigned because of illness.

As president of CUC, Starnes will be responsible for directing all field operations of the company, including marketing and implementation of all systems. Before joining CUC in December, 1968, Starnes was director of IBM's data processing activities with the Defense Department and the military services.

Get the Flexibility you need in FILE CREATION FILE MAINTENANCE INFORMATION RETRIEVAL with

FILE EXEC©

By Pioneer Data Systems, Inc.

File Exec gives you great flexibility in file creation, file maintenance, and information retrieval on either tape or disk files.

Written entirely in COBOL, this new system creates files from source data, existing disjoint files or a combination of existing files and source data. After files are created, complete records can be added, data can be added to existing records, fields can be changed and entire records can be deleted.

There's flexibility, too, in FILE EXEC's information retrieval capabilities. This system allows you to select complete records or parts of records based on up to 450 sets of "and/or" conditions. Conditions of selection can be greater than, less than, equal to, or not equal.

FILE EXEC is format independent and allows for re-formatting of complete output records on selected data to tape or disk and/or printer. All of these capabilities are part of the basic system.

Price: $3,000.

Optional capabilities include provisions for processing variable length files and a general report feature.

Write or call for more details.

PIONEER* DATA SYSTEMS

PIONEER DATA SYSTEMS, INC.
308 Merle Hay Tower
Des Moines, Iowa 50310
AC 515 276-6746

NATIONAL SOFTWARE EXCHANGE, INC.
Station Plaza East, Great Neck
New York, New York 11021
AC 516 482-8480

Nothing's as dead as yesterday's news.

If you're reading someone else's five-day old Computerworld each week, you're defeating our entire purpose in life: to bring you all the news of the computer field as it happens. Not a month later. In fact, we're the only publication that does this . . . the only weekly for the EDP field. But you know a lot about us already. After all, you're reading Computerworld right now.

News fades quickly in the fast-moving computer industry. And a fresh issue of Computerworld delivered directly to you each week will help make you more efficient. All for only 17.3¢ per issue with a one year subscription. Do us both some good. Fill out the coupon below. If you're an employer, attach your Computerworld routing list. We'll see that everyone on the list gets a wrap-up of the news while it's still alive each week.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
SIXTY AUSTIN STREET, NEWTON, MASSACHUSETTS • 02160 • TELEPHONE (617) 332 5600

Yes, please send me COMPUTERWORLD for . . .

☐ 1 Year $ 9.00

☐ 3 Years $20.00 ☐ Bill Me

☐ Payment Enclosed

AS

Name

Your Title 40

Co. Name 57 79

Address 16 37

City 38 51

Zip Code 2 6 7 8 15 16 17 18 19 20 21 22 23 24 25 26 27

CW

Return to:
COMPUTERWORLD 60 Austin Street, Newton, Mass. 02160

Please Circle 1 Number and 1 Letter:

YOUR TITLE AND/OR FUNCTION?

A. Operational Management (nonengineering)
B. Computer Professional Staff
C. Corporate Officers
D. Engineering Management
E. Engineering/Scientific
F. Production/Maintenance
G. Sales/Marketing
H. Other _____

COMPANY BUSINESS:

1. Mining or Construction
2. Manufacturer/Computer or Data System
3. Manufacturer/Other
4. Utility
5. Wholesale/Retail
6. Finance
7. Consultants/DP Services
8. Business Service (except DP)
9. Educational/Medical/Legal
10. Government/Military
11. Other _____

Earnings Reports

COMPUTING & SOFTWARE, INC.

6 Months Ended April 30

	1969	a1968
Revenue	$26,166,000	$22,981,000
Earnings	1,485,000	b1,082,000
Shr Ernd	.48	c.35

a—Restated to include results of companies acquired on a pooling-of-interest basis. b—Includes $69,000, or two cents a share, from discontinued operations. c—Adjusted to reflect 2-for-1 stock split in March, 1969.

COMPUTER LEASING CO.

3 Months Ended March 31

	1969	a1968
Revenue	$12,063,470	$5,979,489
Earnings	1,106,312	737,526
bShr Ernd	.21	.15

a—Restated to reflect companies acquired in 1968 on a pooling-of-interest basis. b—Based on average shares outstanding, including residual securities.

CSI COMPUTER SYSTEMS

Year Ended Feb. 28

	1969	1968
Revenue	$541,601	$234,794
Loss	198,368	32,372

COMPUTER USAGE CO.

6 Months Ended March 31

	1969	1968
Revenue	$6,488,595	$7,072,793
Earnings (loss)	(425,152)	a218,390
Shr Ernd		b.22

a—Equal to 29 cents a share. b—Based on income before gain for sale of property of $52,605.

HUDSON LEASING CORP.

3 Months Ended March 31

	1969	a1968
Revenue	$4,300,952	$2,518,189
Earnings	366,515	116,872
Shr Ernd	.30	.13
9 Months Ended March 31		
Revenue	$11,535,640	$6,200,270
Earnings	b966,992	330,765
cShr Ernd	.81	.40

a—Restated to include General Aviation Services Ltd. on a half pooling-of-interest basis. b—Equal to 90 cents per share. c—Based on income before special credit of $123,611. d—Gain from sale of 25% interest in Eurolease S.A.

DO YOU THINK ONCE A MONTH IS ENOUGH?

We feel that 4 times is better, for more impact and more results.

We're talking about advertising your products or service to a fast-charging, fast-moving group of people like those in the computer industry. At COMPUTERWORLD we think 4 times a month rather then just once and we feel you should too. (We're a weekly newspaper.)

That's why . . . COMPUTERWORLD has come up with "4 For" Plan.

"4 For" is designed to help you get 4 times more impact with your advertising program . . . for only a few dollars more than you would pay for 1 time in a leading monthly magazine.

Check the numbers in the box below and you'll see what we mean.

COMPUTERWORLD "4 FOR" PLAN

COMPUTERWORLD	1 TIME	4 TIMES	A LEADING MONTHLY	1 TIME
TABLOID PAGE	$ 1,173.00	$ 4,284.00	NOT AVAILABLE	
7" x 10"	$612.00	$2,254.00	1–pg. (7x10)	$1,910.00
3 col. x 8"	420.00	1,545.60	2/3 page	1,415.00
5" x 7" (1/4 pg.)	318.50	1,176.00	1/2 page	1,040.00
2 col. x 5"	182.00	700.00	1/3 page	680.00

Based on SRDS April 24, 1969

With our "4 For" Plan, your ad will reach our 30,000+ paid subscribers every week for a month (120,000 impressions a month).

For more information, contact your nearest COMPUTERWORLD sales office or Neal Wilder, National Sales Manager, (617) 332-5606.

Think "4 For" then think 52.

POSITION ANNOUNCEMENTS

SALES MANAGER DATA PROCESSING SERVICES

Nationwide Company with a Computer Services Division needs a professional to help expand its specialty of Data Processing for the Life Insurance Industry. At least 3 years experience in computer hardware or software sales and ability to develop marketing strategy. Some travel in Midwest. You'll enjoy an excellent salary, plus commissions and expenses, and participate in the broad benefit program of an organization with a solid financial base.

Send your work history (Including salary) to Box # 3071.

EDP PERSONNEL

Major corp is seeking qualified personnel in sales & technical areas

SALESMEN/SALES MGRS:
Software/Hardware Sls
Peripheral Salesmen
Computer Services Sls
Computer Leasing Sls
Time Sharing Salesmen

SYSTEMS & PROGRAMMERS:
Software Development
Telecommunications
Time Sharing
Systems Design (R/T)
Programmer Analysts

Salary ranges for all categories $15-25,000
Send resume, visit or call (212) 532-8300

Don Howard Personnel
290 Madison Ave (40th St) NY 10017
(agency fees paid by employer)

A major company in the Computer Management field needs a top level writer to produce sales, corporate and recruiting literature. Located in Chicago suburbs. Previous experience desired. Salary commensurate. Top notch opportunity. Send resumes and samples to:

CW Box #3073

SYSTEMS ANALYST FOR FOOD WHOLESALER

Leading Western firm requires person with two or more years experience as systems analyst and exposure to management level of retail food distribution . . . Must have knowledge of programming language other than RPG . . . Experience with direct access devices desirable . . . Position leading to installation of real-time system. Salary commensurate with ability. Send full resume and salary requirements to:

Box #3072

TIME FOR SALE

PHILADELPHIA

FREE Write or call for current copy of "Computer Time Availabilities," a quarterly listing of computer time to buy and sell.
Nationwide
Computer Time Brokers
MACS
Management And Computer Services, Inc.
104 Park Towne Place East, (CW)
Philadelphia, Pa. 19130
215 LD 9-2966

MASSACHUSETTS

PRIME TIME

Available Sept. 1
also 2nd and 3rd shifts
Honeywell Series 200
16K configuration
5 tapes–44KC
card reader, printer, and punch

Management Computer Usage Co., Inc.
888 Washington Street
Dedham, Mass.
(617) 329-2250

128 KEY PUNCH

- Professional Media Conversion
- Volume Keypunching–Verification

Phone (617) 899-4851

KEY PUNCHING
$4.50 per hour
Call 617-746-6210
AUTO-COM, Inc.
15 Main Street Ext.
Plymouth, Mass. 02360

DIGITIZER TIME

2 AUTOTROL 3700's AVAILABLE TO CONVERT GRAPHICAL INFORMATION TO IBM CARDS – 40 BY 60 INCH WORKING SURFACE – $18.50 PER HOUR WITH OPERATOR-PROGRAMMING SUPPORT FOR SPECIAL APPLICATIONS – EXTENSIVE WORK WITH PRINTED CIRCUITS AND ARTWORK GENERATION.

DESIGN SYSTEMS, INC.
6 St. James Avenue
Boston 482-2285

CHICAGO AREA

TIME AVAILABLE
CHICAGO NORTH SIDE
IBM 360/40 – 256k

5 Tape Drives – 2401
1 2314
3 Printers – 1403
2 Card Readers – 2540
1 Card Reader – 2501

FULL OR PARTITIONED USE CALL

Manager DATA PROCESSING
(312) 262-1607 Ext. 396
BELL & HOWELL
7100 McCormick Rd.
Lincolnwood, Ill.
60645

IBM 360/40, 65K, Five Model 3 Tapes, Two 2311 Disks, 1403 N1 Printer, 2540 Rdr./Pch., All Shifts and and Weekends, Call Mr. Wieland at 312-236-4700.

PLAYBOY® HAS
COMPUTER TIME AVAILABLE

IBM 360/40, 256 K,
8 Tape Drives,
2314, 1403 N-1, 2540
IBM 360/30, 32 K,
5 Tape Drives,
1403 N-1, 2540
Call
Data Processing Director
(312) 642-1000

$50. to $75. hour
IBM 360-40
1401-1410 Compatibility
O.S.-DOS
Key Punching · Programming
COMPUTYME OF CHICAGO
209 WEST JACKSON BLVD.
CHICAGO ILL. 312-922-6624

MICHIGAN

Ann Arbor – IBM 360-30
65k, 4 tapes, 3 disks, 2 selectors, 1 multiplex high speed printer.
Data Management, Inc.
109 East Madison
Ann Arbor, Michigan
313-761-1600

SAN FRANCISCO

GOOD RATES on our IBM 360/30

65K, 4 high-speed tape drives, 3 2311 disks, 1100 LPM Printer

Located close to downtown San Francisco
Easy Freeway access
Free parking facilities available

We are a private user with 2+ shifts available (some prime time).

Special rate for large quantity, extended period use.

Clent Sanders
STANDARD BRANDS INC.
500 Paul Avenue
San Francisco, Calif. 94124
Phone: 415-467-5200

Univac 1108 WOULD YOU BELIEVE

$585 Per Hour – Prime Shift

(5 hours per month, minimum use)

Lower prices other shifts

Contact: Bob Cosby (213) 451-5441 Data Processing Applications, Inc. 1714 18th Street, Santa Monica, California

MORE BUY SELL SWAP

IBM Computer Systems and Punched Card Equipment Bought and Sold.
International Computer Equipment, Inc.
I-C-E, Inc.
1231 25th St. N.W.
Washington, D.C.
202-293-3910

COMPUTER ACQUISITIONS CO.
WE BUY ■ WE BUY
WANTS
■ *COMPUTERS, ALL MAKES*
■ *UNIT RECORD EQUIPMENT*
(404) 636-8090 • BOX 29185
ATLANTA, GA. 30329
WE BUY ■ WE BUY

IBM 1620-I (20K)
Available Immediately
FULL PRICE $15,000.
Paper Tape I/O,
Flexowriter Included
Computer Brokers Inc.
910-17th Street N.W.
Washington, D.C. 20006
(202) 659-1344

WANTED TO PURCHASE
COMPUTER SERVICE
BUREAU
Metropolitan New York Area
We are a financially oriented Management Consulting and Service Organization expanding our operations in the New York area. We are interested in part or complete purchase of small to medium sized service bureau. Must have record of growth, profitable operations, and good management. Write to:
Mr. I.Metz
Management Research Associates
Shaker Building
3645 Warrensville Road
Cleveland, Ohio 44122

BUY-SELL-SWAP

Purpose:

- To provide at low cost a general market place for equipment, systems, services, supplies and the like for the computer community.

Requirements:

- *Minimum ad size 1 column by 2 inches*
- *No maximum size*
- *Borders allowed*
- *Reverses allowed*
- *Logos allowed*
- *Lineage discounts apply to large ad or long runs*

POSITION ANNOUNCEMENTS

systems programmers

■ Does the installation of a /360 model 67 time-sharing system sound like the start of some interesting systems work to you?

■ Does the fact that you could play a major role in creating a time-sharing system, that may very well be the best of its kind, interest you?

We need programmers from the senior level on down. If you have a Bachelor's degree and 1 or more years of experience using BAL, and would like to reap the satisfaction and experience of working on this system, we'd like to talk with you.

Perkin-Elmer has an impressive growth history with sales of over 151 million evenly divided between commercial and government contracts. We are located in desirable Fairfield County, Conn., less than an hour from New York City.

Send your resume and salary requirements in complete confidence to, or call collect, Mr. R. Dennis, (203) 762-6107, The Perkin-Elmer Corp., Electro-Optical Division, 50 Danbury Road, So. Wilton, Conn. An equal opportunity employer.

PERKIN-ELMER

SYSTEMS PROJECT MANAGER

The nation's largest specialty mail-order firm is looking for an analyst programmer. Sophisticated 360 hardware configuration with real-time application. Applicant must have a minimum of 4 years experience in systems development and programming 360 BAL and COBOL.

Send resume to
HAROLD CLARK Director of Data Processing

SUNSET HOUSE
12800 Culver Blvd., L. A. Calif. 90066
Equal Opportunity Employer

BRANCH SALES MANAGER PROPRIETARY SOFTWARE

— Several Openings In Major Markets —

DATA & INFORMATION PRODUCTS, INC.

(A Subsidiary of Applied Data Research, Inc.)
Representatives for
Applied Data Research, Inc. — (AUTOFLOW)
Boole & Babbage, Inc. — (SMS/360)
REPO/360
Other DP Products & Services
10 W. Main St.
Park Ridge, Ill. 60068
An Equal Opportunity Employer

INSTRUCTOR-ANALYST

Unusual opportunity in challenging, rewarding position in innovative DP environment — 360 OS with multiprogramming and teleprocessing. Teach part time — systems and programming part time. Bachelors Degree in Business related field, 2 yrs. 360 experience. Excellent benefits and opportunity for growth. Write J.R. Hill, Dallas County Junior College District, Main & Lamar, Dallas, Texas 75202 or call 214-742-1411.

IF

- you feel the time has come to change your environment to the Southern California scene.
- you want to join a governmental agency where growth is the word for the future with stability and benefits among the best anywhere.
- you want to advance your personal achievements in Data Processing by being associated with applications and development among the most advanced in the industry.

Then look at these *SIX* task areas with which you could become involved; over 100 new positions are being added in the 1969-70 budget year to keep our data processing activities the most advanced anywhere.

* *ADMINISTRATION — PERSONNEL — BUDGETING*

* *ENGINEERING — HIGHWAY — PUBLIC WORKS*

* *JUDICIAL — LAW ENFORCEMENT — PUBLIC SAFETY*

* *MEDICAL — HEALTH CARE — WELFARE*

* *PROPERTY — LAND USE — URBAN PLANNING*

* *RECORDS — STATISTICS*

The County of Los Angeles serves over 7 million people, and our annual budget exceeds over $1.7 billion. We are advanced in data processing applications; and to stay there, we are budgeting nearly $20 million this coming year. We need capable, competent programmer analysts at several levels. If you meet the minimum requirement stated, we would like to hear from you. College, while desirable, is not required; nor is citizenship, if you have made your declaration of intent.

- *Programmer Analyst start at $966 or $1020 mo.*
  2 Years experience, 1 year COBOL background minimum
- *Senior Programmer Analyst start at $1048 or $1170 mo.*
  3 years experience, 2½ years COBOL background minimum
- *Communications - Teleprocessing Analyst start at $1170 or $1458 mo.*

1 year experience in heuristic systems BTAM — QTAM — FASTER

Some of the benefits are:

2 to 4 weeks vacation
Over 12 paid holidays
Guaranteed cost of living raise each July 1
5-step pay plan most positions
Paid Health and Life insurance with options
Generous sick leave
Up to 75% of salary retirement system

For further information submit your resume today to:

P. D. Geer
Department of Data Processing
726 Hall of Administration
500 W. Temple Street
Los Angeles, California 90012

or call (213) 625-3611, Extension 64020

BUY SELL SWAP

FOR SALE

IBM 705 Mod II – 40K
10 each 727 tapes
All, part or time

Greg Electronics
5201 Alhambra,
Los Angeles, Calif. 90032
(213) 223-3281

FOR LEASE

Two 1403 B3 Systems with 1402-1, 1403-2. Available June 1 & July 1, under maintenance contract. Available under short term lease at 30% discount. Contact: Richard Allen 1562 Lemoine Avenue, Fort Lee, N.J. 07024 (201) 944-5966

FOR IMMEDIATE LEASE

– IBM 1401 C4, 1402-2, 1403-2, 1406-1. $2,200.00 per month for 24 month lease. Also 4K 1401 C3, $1,700.00 per month for 24 month lease. Summit Computer Corporation, 785 Springfield Avenue, Summit, N.J. 07901 (201) 273-6900.

WANTED:

(2) IBM 360/40 CPUs
131K or 262K
Immediate Requirement
Peripherals Optional

Computer Brokers Inc.

910-17th Street N.W.
Washington, D.C. 20006
(202) 659-1344

FOR SALE

1401 C-4 8K
Two each 2311, one each 2841
Central Equipment Company, Inc.
(816) 221-1211

Wanted

1 2540 Card Read Punch
1 1403 N1 Printer
1 2821 Control Unit Model 1
3 2401 Mod 2 9 Track Tape Drives
1 2401 Mod 2 7 Track Tape Drive
1 2803 Tape Control Unit

For Sale or Lease

1 1403 Model 7 Printer
1 1403 Model 2 Printer
1 1442 Model N1 Card Read Punch
1 2821 Model 2 Control Unit

Available 60-90 days. All currently under IBM maintenance. We are principals.
Contact: Miss Larkin at (212) DI9-2100

WANTED to buy

NCR 315-100 10 to 20K slab, 5 tape system under maintenance contract.

Contact:
Gene Rogers
(219) 284-1280
St. Joseph Bank Computer Center
202 South Michigan Street
South Bend, Indiana 46601

FOR SALE
UNIVAC 1004
PANELS AND WIRES
PANEL FULL OF WIRES
$50.00 each

ARKANSAS VALLEY INDUSTRIES
300 University Tower Building, Little Rock, Arkansas 72203
CONTACT: T.W. Walker
(501) 666-0361

IBM KEYPUNCHES

IMMEDIATE DELIVERY

At our plant we remanufacture all types of unit record equipment.
Universal Processing Corp.
228 Highland Parkway
Roselle, N.J. 07203
(201) 241-7422

FOR SALE

IBM	1401	Model C6
IBM	1406	Model 3

16K Main Frame

- Advance Programming
- Hi-Lo-Equal Compare
- Print Storage
- Tape Intermix
- plus Other Features

Call or Write:
Mr. Orrin P. Rugen
AFNB
40 N. East Street
Indianapolis, Ind. 46204
(317) 633-1440

URGENTLY NEEDED
FOR EXPORT
IBM "TAB" EQUIPMENT AND COMPUTERS
– BEST PRICES PAID –

Will deal only with users – no brokers. Give us the model, serial number, availability. Will buy machines on, or off, maintenance agreement. Write us immediately – we answer every letter. Computerworld, 60 Austin St., Newton, Mass. Box #3070.

FOR SALE
All types IBM
Unit Record
Equipment
026, 024, 082, 083
077, 085, 088, 402
407, 084, 108 & 047
TLW Computer Industries
Box 29763, Atlanta, Ga.30329
(404) 451-1895

IBM MACHINES FOR SALE

024–$550; 026–$2000; 056–$400; 077–$900; 082–$1000; 083–$4000; 084–$6500; 402–$1100; 403–$1500; 407–$4700; 514–$1400; 519–$1800; 557–$4500; 602–$900; 604/521–$1900; Disk Packs (1316) $200; Burster $400; Cardiotioner $300; Verifiers (Hand) $100; Panels 50% off.

ALL DP CO.
105 Hinricher
Willow Springs, Ill.
312-839-5164

SOFTWARE FOR SALE

SOFTWARE FOR SALE

7 col. inch	$63.00
6 col. inch	$56.00
5 col. inch	$49.00
4 col. inch	$42.00
3 col. inch	$35.00
2 col. inch	$28.00
1 col. inch	$14.00

Minimum run at these rates 13 weeks (prepaid).

"CENTAUR"
Automatically converts IBM360 level E and NCR315 COBOL to NCR Century COBOL
A limited number of licenses are available. Conversion of your programs on a job basis is possible.

"JULIANIZE"
A COBOL subroutine which converts calendar date to julian date.

"ELAPSE"
Calculates actual number of days between two dates – COBOL.
CUSTOM Programming
PO Box 1082
Shawnee-Mission, Kansas 66222

MAILING LABEL SYSTEM

Imaginative set of programs written in 360 COBOL (32K and up) offer many desirable features:

- Checks master file for duplicate names and addresses
- Compresses the label during printing to eliminate any blank lines in the name and address
- Highly flexible file format
- Label print program contains restart feature

Availability:

- Programs can be purchased, leased, or:
- Labels will be processed at a fixed fee per label. A master file of 60,000 names and addresses is already available containing corporate presidents, school superintendents, consulting engineers, and others.

For further informaiton write or call:
QUANTUM ASSOCIATES
P.O. Box 7597
Pittsburgh, Pennsylvania 15213
412-364-6888

ACTION n/c soft ware

4 to 6 Times the Speed of AD-APT/ AUTOSPOT

- IBM 360–32K
- 2 to 5 Axis P-to-P & Cont.
- OS or DOS
- Can operate in a multi-program environment.
- Over 200 companies now using ACTION.

ncics
numerical control & computer services
Div. Eugene Dietzgen Co.
28749 Chagrin Blvd. • Cleveland, Ohio 44122
Telephone: 216/831-8587
Serving N/C Users Exclusively for over 6 Years

STOP USING DISC
AS IF IT WERE TAPE

RANDOM ACCESS METHOD DISC INPUT-OUTPUT SYSTEM

Up to three times faster than ISAM.

Flexible enough to process random or sequential files in a random fashion.

Eliminates costly file reorganization and index addressing.

Provides automatic record blocking/deblocking and overflow handling.

Designed for any System/360 configuration under OS or DOS.

INTERESTED? Contact:

Len Farr
Isaacs-Dobbs Systems, Inc.
1100 Glendon Avenue
Los Angeles, California 90024
(213)-879-9534

IBM 1130 USERS
SAVE MONEY
SAVE COMPUTER TIME
SAVE PROGRAMMER TIME

Use DNA's "XDUP", Extended Disk Utility Program for the 1130. Extremely fast execution times. NO MONITOR MODIFICATIONS. Easy to use. Time and dollar-saving features not present in 1130 DM-2 DUP include:

*DELETE – Deletes single or sequential blocks of LET/FLET entries without repacking. – 3 seconds

*PACK – Packs disk at user's convenience, not after every delete!

*STOREDATA – Sets up files directly in UA or FX. Optionally initializes the file to any value. No WS requirements or card reading to set up large files in FX. – 4 seconds

*STOREMOD – Loads existing card files directly to UA or FX. *DUMPDATA can now provide back-up for files larger than WS.

*STOREMOD – Option to initialize existing files to any value. No need to write FORTRAN programs to zero files with "XDUP" available.

For more information contact:
DNA SYSTEMS
DNA Systems, Inc.
2415 W. Stewart Avenue
Flint, Michigan 48504
(313) 789-4402
– Specializing in 1130/1800

FOR SALE
IBM 704 SYSTEM
BENSON-LEHNER MODEL J PLOTTER
DIGITAL EQUIPMENT CORPORATION MODEL 338 PROGRAMMED BUFFER DISPLAY

General Electric Company
TEMPO
P.O. Drawer QQ
Santa Barbara, Calif. 93102
Call
T. R. Curry
(805) 965-0551

MINIDISK

Are you still running your 1400 formatted disks under COMPATIBILITY or COS?

Want to break the DISK AUTOCODER habit and run them under COBOL?

DO IT WITH MINIDISK!

By linking this compact subroutine (1500 bytes) written in BAL into your COBOL program you can process all 1400 packs in sector mode presently running under straight Compatibility or the COS package.

MINIDISK will process:
1. Consecutive Input or Output, Blocked/Unblocked.
2. Random Input or Output, Blocked/Unblocked.
3. Control Sequential Input Unblocked only.

Each file (MINIDTF) requires 24 bytes plus 100 bytes for each sector. MINIDISK will handle up to 20 sectors for each file. There is no limit as to the number of files MINIDISK will handle in a given program.

Priced Reasonably, Write:
C.E.S. ASSOCIATES
194 North Stamford Road
Stamford, Conn. 06903

SOFTWARE FOR SALE

360 COBOL (Disk/Tape)

PAYROLL/PERSONNEL SYSTEM

Series of 16-22 easy-to-maintain programs. Handles multi-company/state, hourly & salary payrolls. Unique union matrix (if required) to process unlimited union or special pay configurations. Complete file maintenance, documentation, JCL, etc. Several versions available. Contact us about references, custom modifications and detailed info. All versions $4,500.

COMM/SCI SYSTEMS CORP.
785 Market Street
San Francisco, California 94103
(415) 392-5379

A New & Complete General Purpose Payroll System At 25% The Usual Cost ... Featuring ...

Complete flexibility for reporting regular time, overtime, shift premium and up to 10 other company defined payments, or deductions, labor distribution, multiple checks and many other reports.

SYSTEMS REQUIREMENTS: IBM System 360 Model 30, Minimum Computer Equipment Configuration; 32K Core including Supervisor; either disk (2311) or tape oriented. Delivery & Installation 5 days After Contract. Price $5,350.00. For complete information, write or call:

COMPUTER PROCEDURES CORPORATION
Division of Colonial Commercial Corp.
181 S. Franklin Ave.
Valley Stream, N.Y. 11581
(516) 791-2000 (212) 895-6808

PATCH

ASSEMBLER LANGUAGE PROGRAMS

360 DOS Users — Investigate QQQPATCH — an aid in patching Assembler Language Programs

Replace Instructions
Add Instructions
No Re-Assembly
No Re-Link-Edit
Use Pneumonic Op Codes (MVC Not D2)
No Conversion to Base and Displacement Addressing

Save Computer Time
Save Programmer Time

Lease: $380 First Year
$ 35 Each Renewal Year

For Information Write to:

I X SOFTWARE, INC.
2305 Tampa Bay Blvd. — 202
Tampa, Fla. 33607

STANDARDIZE YOUR 360/DOS PRINT OUTPUT

COBOL or ALP subroutines to handle printer output to any device

*Fast line output * Save core
*Handles multi-outputs with 1 routine
*Automatic heading & line control

Price: $85.00

For information contact:

L.W. Fogg, III
International Telecontrol Corp
4300 Pine Street
Washington, Delaware 19802
Phone: (302) 762-5605

STARTING A SERVICE CENTER?

THE FIRST/GENERAL LEDGER SYSTEM IS THE BEST FIRST PRODUCT

EASY TO SELL
OPENS YOUR MARKET
PROVED PROFIT
A PROVED WINNER!

NOW USED IN 14 CENTERS

CONTACT
COMPUTER RESOURCES CORPORATION
BOX 431
WILTON, CONN. 06897
PHONE: (203) 762-8357

"I've got lots of data... but no information!"

If information you need for day-to-day decisions is being hoarded by your IBM 360, Spectra 70, or IBM 1401 computer, investigate

EASYTRIEVE 300

Product Software by MSS

EASYTRIEVE is an information retrieval and reporting system that bridges the gap between computerized information files and executives, managers, and supervisors (with or without computer experience) requiring access to the files for day-to-day business decisions.

PRODUCT BRIEFINGS

June 24, Washington, D. C.
June 25, New York
June 26, Boston

For details, write or call:
MR. SHELDON T. KATZ
Vice-president

MANAGEMENT SCIENCE SYSTEMS
1530 East Jefferson Street
Rockville, Maryland 20852
(301) 427-1840

Selective Information Retrieval System

A new computer program that allows you to —

* Select records from any sequential tape or sequential disk file
* Save specific information from the records selected
* Use any condition of selection
* Begin fields used in conditions of selection in any byte of a record
* Use up to fifty "AND"/"OR" conditions in selecting any class of record

Designed for S/360, DOS, 32K and up. Send for full details.

PRICE: Upon Request

Contact: L.H. Baker
Pioneer Data Systems, Inc.
Suite 308 Merle Hay Tower
Des Moines, Iowa 50310
Phone (515) 276-6746

COBOL USERS

DETOC

- **INCREASES PRODUCTION**
- **REDUCES COSTS**
- **IMPROVES SYSTEM EFFECTIVENESS**

Use DETOC PROCESSOR with decision tables to cut designing, programming, debugging, and maintenance time.

DETOC, ISL's new Decision Table to COBOL Processor, is available now through our complete leasing program that includes ongoing maintenance, training and retrofitting of improvements. For more data, call collect or write:

Howard Conrad

INFORMATION SYSTEMS LEASING CORP.
The Plaza
Jenkintown, Pa., 19046
(215) 885-2100

XI-TRAN
The Cobol Pre-Compiler

It permits the user to write COBOL in abbreviated form for
IBM 360; H-200; GE 400-600
$1175.00-includes 1 yr. free Maint.
Contact:

XANKE, INC.
2367 Tacoma Avenue South
Tacoma, Washington 98402
206-383-2628

GRS

GENERAL RETRIEVAL SYSTEM

Since 1966 over 40 organizations have installed and are now using GRS to save costly programming and computer time.
GRS allows executives, managers, auditors and others with a need for information to directly interrogate their computer without the aid of a trained programmer. Especially useful for one-time and special reports, GRS selects, sorts, accumulates, calculates, and prepares reports to the exact specifications of the user. GRS can also help programmers debug programs, develop test data and accelerate conversions to third generation systems.
Written entirely in COBOL, GRS operates on
IBM-OS/DOS
BURROUGHS
UNIVAC
RCA
HONEYWELL
Plus other COBOL supported configurations
For information write or call:
Information Science Incorporated
New City, Rockland County,
New York 10956
(914) 634-8877

---

cobol MAIN-GEN

Generate Edit Verification and File Maintenance programs in Cobol. Complete operational systems in **ONE HOUR.**

Scorpio Data Systems Inc.
Tallman Center
Tallman, New York 10982
(914 357-5845)

1130 V-1 To V-2
FILE CONVERSION PROGRAM

"V1V2" moves V-1 disk data files to a V-2 disk(s). Moves all or specified files. Allows choice of destination (UA-FX) and cartridge ID. Creates LET/FLET entries automatically. Complete transfer log. No calculations, bit-switching, or card dumping. Debug V-2 programs with live data. Average conversion time — 5 min./V-1 disk.

DNA Systems, Inc.
2415 W. Stewart Ave
Flint, Michigan 48504
(313) 789-4402

PAYROLL PACKAGE

Multi-branch, hourly and salary, all state and local taxes, generates all corporate and government reports. Currently operational. Thoroughly documented in a clear cut manner. Available for IBM 360 and H-200.
Price $6,000

AUTOMATED INFORMATION SYSTEMS, INC.
1 Washington Street
Wellesley Hills, Mass. 02181
(617) 237-3580

---

360 Payroll System
— 100% COBOL —

Series of 23 programs which process hourly and salaried payrolls in a multi-company environment. Liberal deduction capabilities. Full labor distribution reporting. Complete file maintenance facilities. Excellent documentation. Runs on IBM 360 with 32K and two 2311 Disk Drives. This system is now being used and has proven highly successful.

PRICE: $ 5,000.

Levin-Townsend Service Corporation
One Decker Square
Bala Cynwyd, Pa. 19004

New "Load and Go" Report Writer

REPO/360

"Special" Reports reach mgmt. while still "special"

Executes up to 20% faster than COBOL or RPG

NO — Compilation, Link-Editing, Cataloging

Diagnostics complete & extensive

Easy to Learn—Programmer, ½ day; Non-Programmer, one day

Training & Maintenance included

Data & Information Products, Inc.
(A Subsidiary of Applied Data Research, Inc.)
10 West Main Street
Park Ridge, Ill. 60068
(312) 692-7153

SCORE™

Information Retrieval & Reporting System

FACT:
It's a Cobol Program Generator
. Retrieval System
Report Generator
File Generator
Conversion Aid
and a Utility
(sort, etc.).

FACT:
32 major users have it doing the above... and then some

CONCLUSIONS:
We invite you to draw your own.

Seminars:

July 8th — Cleveland, Ohio
July 9th — Columbus, Ohio
July 10th — Cincinnati, Ohio
July 15 — Hartford, Conn.
July 16th — Philadelphia, Pa.
July 23rd — Washington, D.C.

Contact Robert Wolk of Atlantic Software Inc. at (215) WA 5-8424

NEW 1969

AUTOFLOW*

In use at over 550 INSTALLATIONS throughout the world

An automatic flowcharting, debugging and maintenance system* that produces 2 dimensional detailed and high level flow charts and special listings directly from COBOL, FORTRAN, PL-1, and assembly language input.

AUTOFLOW also produces listings of syntax errors, logic errors, procedure division statement summary, data-name cross reference, label, (or paragraph or statement number) cross reference index, alphanumeric label index.

Available for: IBM 360 systems, H-200 systems, Spectra 70 systems, IBM 1400 and 7090 systems.
Write for new 1969 literature, free demonstration and pricing information.

APPLIED DATA RESEARCH, INC.
Route 206 Center • Princeton, N.J. 08540
609-921-8550
*Offices in principal cities throughout the U.S.

**Patent Pending*

Your IBM 360 sort time is costing you a bundle. How about cutting it in half? With no conversion costs.

It's PISORT... completely compatible with DSORT... just plug it in and cut your IBM 360 sort time by as much as one-half. If you're operating with 65K or more on DOS, you'll find that PISORT does more than merely cut your sort time. It cuts disk working space in half. It improves turn-around. It eliminates expensive tape merges by handling larger files. **LET PROGRAMMATICS PROVE IT. TRY PISORT FOR 30 DAYS FREE OF CHARGE.** And that's no real gamble... either for us or for you. PISORT is meeting its specs on computers all over the country. We're positive thirty days with PISORT will make you a permanent user. Lease cost, by the way, is only $200 per month. And we're so confident of the product we've even provided a liberal lease cancellation clause. Now, what's your excuse?

PROGRAMMATICS
a division of Applied Data Research, Inc.
11661 San Vicente Blvd., Los Angeles, Calif. 90049
213 826-6503

for the most rapid service, direct your inquiry to

Applied Data Research, Route 206 Center, Princeton, New Jersey 08540

or call 609 921-8550.

Other Applied Data Research offices and representatives can help you in your own locale...

WASHINGTON, D.C. ■ 2425 Wilson Blvd., Arlington, Va. ■ 703 528-3141
LOS ANGELES, CALIF. ■ 15720 Ventura Blvd., Encino, Calif. ■ 213 783-3500
SAN FRANCISCO, CALIF. ■ 420 Market Street, San Francisco, Calif. ■ 415 981-4740
BOSTON, MASSACHUSETTS ■ Lakeside Office Park, Wakefield, Mass. ■ 617 245-9212
DENVER, COLORADO ■ 701 South Logan St., Suite 110B, Denver, Colorado ■ 303 777-3794
NEW YORK, N.Y. ■ 450 Seventh Ave., New York, N.Y. ■ 212 244-5700
DATA & INFORMATION PRODUCTS, INC. (Sales Representatives)
ATLANTA, GA. ■ 3127 Maple Drive, N.E., Atlanta, Ga. ■ 404 233-3087
CHICAGO, ILL. ■ 10 West Main Street, Park Ridge, Ill. ■ 312 692-7153
CINCINNATI, OHIO ■ c/o Associated Offices, Inc. 1717 Section Road, Room B-6, Cincinnati, Ohio ■ 513 531-3060
CLEVELAND, OHIO ■ 21330 Center Ridge Road, Cleveland, Ohio ■ 216 331-1608
DALLAS, TEX. ■ 400 Tower So., 2720 Stemmons Freeway, Dallas, Tex. ■ 214 638-3890
DETROIT, MICH. ■ 3049 East Grand Blvd., Detroit, Mich. ■ 313 875-5721
KANSAS CITY, MO. ■ 4643 Wyandotte Ave., Suite 208, Kansas City, Mo. ■ 816 753-5372
MILWAUKEE, WIS. ■ 2433 North Mayfair Road, Wauwautosa, Wis. ■ 414 771-7880
MINNEAPOLIS, MINNESOTA ■ 1153 Plymouth Building, Minneapolis, Minn. ■ 612 333-6050
PHILADELPHIA, PA. ■ 215 Ford Road, Bala Cynwyd, Pa. ■ 215 835-2088
ROCHESTER, N.Y. ■ 871 Monroe Ave., Rochester, New York ■ 716 442-0420
ST. LOUIS, MO. ■ 7811 Carondelet Avenue, St. Louis, Mo. ■ 314 862-2120

FOREIGN OFFICES

CANADA ■ (Sales Representative) Dearborn Computer of Canada, 250 University Ave., Toronto, Ontario, Canada ■ 416 368-8477
TOKYO, JAPAN ■ (Sales Representative) Japan Office Supplies Co., Limited ■ No. 15-11 2-Chome Honhaneda, Ota-Ku, Tokyo, Japan
EUROPEAN ■ (France, England, Belgium, Holland and Switzerland) (Sales Representative) CENTRE D'ANALYSE ET DE PROGRAMMATION, 21 Rue Leriche, Paris, 15e France
EUROPEAN ■ (Sweden, Denmark, Norway and Finland) (Sales Representative) SYSTEMATIK AB Banergatan 37, Stockholm, Sweden

9